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Evaluation of Methods to Control Air-borne Infections*

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AMONG the new committees of the Association listed in the April issue of the JOURNAL is the Subcommittee for the Evaluation of Methods to Control Air-borne Infections, of the Committee on Research and Standards. This subcommittee was still being formed when that issue went to press, and only the chairman is indicated. Since then the others on the committee have accepted membership and are as follows, in alphabetical order:

F. W. Gilcreas, Assistant Director, Division of Laboratories and Research, New York State Health Department, in charge of Laboratories for Sanitary and Analytical Chemistry.

Alexander Hollaender, Senior Biophysicist, U. S. Public Health Service

Captain Alexander Langmuir of the Army Epidemiological Board's Commission on Acute Respiratory Diseases, Fort Bragg, N. C.

O. H. Robertson, M.D., Professor of Medicine at the University of Chicago, and Chairman of the Army Epidemiological Board's Commission on Air-borne Infections

William F. Wells, Associate Professor of Research in Airborne Infection, University of Pennsylvania Medical School

George M. Wheatley, M.D., Assistant Medical Director of the Metropolitan Life Insurance Company, and Secretary of the American Public Health Association School Health Section

C. P. Yaglou, Associate Professor of Industrial Hygiene, Harvard Medical School.

The formation of this committee is a recognition of the need for a coördinating group representing a variety of professional workers interested in and concerned with the problem of the control of air-borne infection. This problem concerns the bacteriologist, epidemiologist, practising physician and surgeon, hospital administrator, ventilating engineer, illuminating engineer, physicist, health officer, school administrator, plant manager, and office manager (to say nothing of the group most concerned of all, the general public).

The brilliant results from improvement in environmental sanitation as a result of purification of water supplies, proper disposal of sewage, and sanitary production and pasteurization of milk, are in contrast with the failure thus far to control air-borne infections (using the term in its broadest sense to include droplets and dust), with the exception of those few diseases in which there has been developed an effective means of active immunization. If the control of infections of the respiratory tract can be applied at the point of the mode of transmission rather than at the point of

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decreasing the susceptibility of the potential victim, there are certain obvious advantages; namely, (1) protection against many diseases at one time through application of a single procedure, and (2) the protection of large numbers of individuals regardless of their individual understanding of the problem, through application and supervision of the control method by a relatively small group of individuals. These are the same advantages we have enjoyed in eliminating milk-borne outbreaks through pasteurization of milk, and eliminating water-borne outbreaks through improvement of water supplies. The matter is more complicated with regard to air-borne infection, since ordinarily relatively small numbers of individuals are exposed intramurally to a single common air supply, compared to the large numbers of individuals often served by a single water or milk supply.

The current interest in the problem and the tremendous increase in the volume of literature on the subject represent a marked recent change in our conception of air-borne infection. It may be worth while to review briefly the history of changes in our conception of the rôle of air in transmitting communicable diseases, and to outline the problem confronting the new subcommittee.

Following the demonology conception of the etiology of disease the miasmatic theory of the causation of communicable diseases held dominant sway until the end of the last century. Air-borne transmission of disease is such a convenient and reasonable manner of explaining all plagues that its ready acceptance is understandable.

About the middle of the last century, however, and still prior to the development of the science of bacteriology, certain careful epidemiologic studies were made with regard to enteric infections, particularly cholera and typhoid fever by Budd [1] and Snow,[2] respectively, in which it was made clear that these particular diseases were transmitted largely through the introduction of human excreta into water supplies. Since these diseases, as well as all the others, were then explained currently on the miasmatic theory, these demonstrations were serious blows to the theory of air-borne transmission.

When the science of bacteriology was established, following the brilliant work of Pasteur and Koch, these earlier epidemiologic observations concerning cholera and typhoid fever were confirmed, and, furthermore, certain additional experiments were conducted which raised the question as to whether or not there was true air-borne transmission of *any* communicable disease. Some of the earliest of these experiments were reported in 1897 and 1899 by Professor C. Flügge [3, 4] of the University of Breslau, based principally on the work of Laschtschenko.[5] He called attention to the fact that droplets of saliva are thrown off from the mouth during sneezing, coughing, and loud talking, and he also apparently demonstrated, through exposing plates at various distances from the subject, that these droplets quickly settled. He concluded that true air-borne infection other than within a few feet of the "infector" was unimportant.

A further blow was dealt the theory of air-borne infection by Dr. Charles V. Chapin, the eminent sanitarian from Providence, R. I., whose critical evaluation of public health administrative procedures resulted in marked improvement in such practice in the United States during the first third of this century.

Dr. Chapin was born in 1856 and became Superintendent of Health for the City of Providence in 1884, thirteen years before the publication of Flügge's first article mentioned above. He retained this position until June, 1931, a total of forty-eight years, and died

in 1941. Throughout his life he was particularly interested in the manner of transmission of communicable diseases, and rightly "debunked" many practices which were in vogue at the time he started his investigations, particularly the practice of terminal fumigation.

One of his most notable contributions was his book *The Sources and Modes of Infection,* first published in 1910 and revised in 1912. One chapter in this book [6] is devoted to the subject of infection by air. The first two sentences of that chapter read: "From time immemorial the air has been considered the chief vehicle of infection. This was but natural, for until recently the virus of the infectious diseases was believed to be gaseous, or at least readily diffusible, and readily borne by air currents." And he concludes this first paragraph with the statement, ". . . the inquiry here made is whether the virus of the infectious diseases is borne by the air, either free or attached to small particles of inanimate matter."

Chapin then goes on to review exhaustively the evidence for and against aerial transmission, discussing the data critically. He places great stress upon bacteriologic findings, particularly the studies by Flügge mentioned above. In this discussion he notes the fact that bacteria have been isolated from the air, and even cautions: "While the tendency is thus away from air infection we must be on our guard lest our generalization carry us too far. It may be a fact that most diseases are not air-borne, and yet further investigation may show that certain other diseases concerning which we are still in doubt may be usually transmitted in this way." [7] Nevertheless, toward the end of the chapter he concludes: ". . . Bacteriology teaches that former ideas in regard to the manner in which disease may be air-borne are entirely erroneous; that most diseases are not likely to be dust-borne, and they are spray-borne only for two or three feet, a phenomenon which after all resembles contact infection more than it does aerial infection as ordinarily understood . . . There is no good clinical evidence that the common diseases are air-borne . . ." [8]

In the last two paragraphs of this chapter, comprising a general discussion, he states:

> In reviewing the subject of air infection it becomes evident that our knowledge is still far too scanty, and that the available evidence is far from conclusive. Yet it is of the greatest practical importance that we should know definitely just what danger there is in air-borne infection, and in what diseases it is to be feared. Infection by air, if it does take place, as is commonly believed, is so difficult to avoid or guard against, and so universal in its action, that it discourages effort to avoid other sources of danger. If the sick room is filled with floating contagium, of what use is it to make much of an effort to guard against contact infection? If it should prove, as I firmly believe, that contact infection is the chief way in which the contagious diseases spread, an exaggerated idea of the importance of air-borne infection is most mischievous. It is impossible, as I know from experience, to teach people to avoid contact infection while they are firmly convinced that the air is the chief vehicle of infection. . . . Without denying the possibility of such infections, it may be fairly affirmed that there is no evidence that it is an appreciable factor in the maintenance of most of our common contagious diseases. We are warranted, then, in discarding it as a working hypothesis and devoting our chief attention to the prevention of contact infection. . . .[9]

It is clear from these statements that Chapin still had an open mind on the subject and that he almost deliberately stressed contact infection out of proportion to the evidence then available as to its relative importance, because he realized that acceptance of an air-borne hypothesis would result in a defeatist attitude so far as important, simple hygienic practices were concerned, such as hand washing.

These views had a tremendous influence in shaping the thought and direct-

ing the practice of health officers, particularly in this country. They did indeed discard true air-borne infection as a working hypothesis and seemingly forgot, as well, Chapin's warning as to possible revision of the conception upon further investigation. For almost a quarter of a century air-borne transmission of communicable diseases was assumed to be essentially nonexistent, other than that due to droplet spray within a few feet of the infectious individual. Clinical and epidemiologic observations contrary to this stand were ignored, or in the case of hospital cross-infections of measles and chicken pox, were conveniently considered *ipso facto* evidence of errors in nursing techniques.

Incidentally, these opinions by Chapin concerning air-borne infection are about the only ones he expressed which have not completely withstood the test of time. As Winslow has recently stated:

> In one respect only have the studies of the last twenty years indicated a real modification of Chapin's viewpoint. This is with regard to the importance of aerial dissemination of infection. . . . It seems certain that in the case of the virus diseases the radius of atmospheric dissemination is wider than Chapin thought; and this is probably also true in the case of certain respiratory infections due to bacteria. On the whole, however, the broad principles of the epidemiology of 1910 remains unchallenged; and the application of those principles has been attended with phenomenal success.[10]

The recent reversal of our conception of air-borne infection starts only a little over ten years ago in 1933, when there appeared the first of a series of articles by William Firth Wells, an engineer. In this article, Wells, who was then with the Harvard School of Public Health, described an apparatus he had devised, called an air centrifuge, permitting quantitative determination of bacteria in air with reproducible results under the same conditions, and he concludes: "In the study of the bacterial sources of aerial contamination, experiments have been made to determine under what conditions bacteria are given off by persons confined in a limited space. This inquiry leads also to an investigation of the physical, chemical, and biological properties of droplets in connection with the theory of droplet infection."[11] Here, then, was a better means of accomplishing what Chapin in 1910 had stated was needed to clarify the problem when he said: ". . . As Winslow in his work on sewer air . . . has so clearly pointed out, a quantitative examination of the floating bacteria is necessary if we wish to determine the real danger from the inhalation of the air."[12]

In 1934, Wells published two papers simultaneously entitled "Droplets and Droplet Nuclei"[13] and "Viability of Droplet Nuclei Infection,"[14] reporting on the results of experiments conducted in the spring and summer of 1933 and presented before the American Association for the Advancement of Science on December 27, 1933. In the first paper he points out that although it is true that larger droplets ejected at the height of two meters or, roughly, the height of a man, will fall to earth within a few feet of the source, smaller droplets evaporate so rapidly that they will evaporate before they will settle to the ground, leaving in the air, in a state of suspension, the bacteria or other particulate matter contained in the droplets. These so-designated "droplet nuclei" remain suspended indefinitely and are readily wafted by air currents. He finds that "Somewhere between .1 and .2 mm. (diameter) lies the droplet size which identifies the droplets of mouth spray that reach the ground within the life of the droplet as against droplets that evaporate and remain in the air as droplet nuclei with attached infection." Although temperature and humidity, and the presence of dissolved substances affect the rate of evaporation to a certain extent, droplet size is the predominating factor.

To demonstrate the actual occurrence of such droplet nuclei, he adopted Tyndall's experiments on atmospheric dust by constructing a tight cylindrical tank 7 feet long, and of the same diameter, along the axis of which was projected a powerful beam of light. Ports along the side of the tank gave a perpendicular sight on the beam, revealing any suspended particles entering its path. When pure water was atomized into this beam it appeared like steam in cold air, which subsided completely when the spray ceased, with the light beam then completely invisible. When an atomized suspension of *Bacillus subtilis* was injected, a delicate pale blue smoke band remained in the path of the beam. Even after this disappeared and the beam became invisible, Wells was able to collect living bacteria from the air by attaching his air centrifuge to the tank and, in fact, was able to recover bacteria from the interior of the tank a week after inoculation.

In his conclusions, Wells states:

> Droplet infection is essentially localized and concentrated while infection broadcast by droplet nuclei is dispersed and dilute. Thus, it readily escapes detection by the instruments previously devised for atmospheric exploration. Failure to discover air-borne infection bacteriologically no more proves its absence, therefore, than failure to isolate *B. typhosus* from a sewage polluted water proves that typhoid fever cannot be conveyed by drinking water.

In a second paper [14] he reports on testing in the same chamber by the same method atomized suspensions of pathogenic bacteria which, of course, are more delicate than *B. subtilis*. He found that he could recover pneumococci, streptococci, and diphtheria bacilli 24 hours after the original atomization. He concludes that these results make apparent "that the time and distance droplet nuclei may travel depend more upon the viability of the organisms in air than upon settling rates."

These experiments, then, clearly indicated that exposure of open plates, which was the bacteriologic procedure employed by early investigators and which led to the conclusion that viable organisms were expelled only a few feet by human beings, was an unreliable method of determining the infectiousness of air since small particles do not settle and thus would not be "registered" on the plates; the plates catch only the larger droplets which fall to earth close to the subject.

The next step was actual demonstration of infection in animals in such a manner that the microörganisms or viruses definitely were carried by the air stream, with elimination of the possibility of direct droplet infection. These experiments, conducted by Wells and others,[15-22] involved such successful transmissions as influenza to ferrets and mice, tuberculosis to rabbits, and poliomyelitis to monkeys.

With the development of these experimental techniques it was possible to experiment with agents which might prevent such air-borne transmission. Such experimentation has extended principally in four directions: (1) physical barriers (face masks, filters, cubicle and room partitions, and control of air currents through differential air pressure),[23-25] (2) disinfection of air through ultra-violet radiation,[15, 16, 21, 26-34] (3) disinfection of air through the use of disinfectant vapors,[35-43] and (4) laying of dust and lint through application of oil to floors and bedding.[44-48]

The problem as a whole, then, facing the Subcommittee for the Evaluation of Methods to Control Air-borne Infections may be summarized as in Table 1.

The above indicates the scope of the problem but the subcommittee decided at its first meeting on June 4 that it does not consider it within its province to evaluate control methods concerned with the primary reservoir (isolation and quarantine, chemotherapy, and

TABLE 1

Possible Methods to Control Air-borne Infections in Enclosed Spaces

Point of Application	*Method of Control* (Considering only enclosed atmospheres)
1. At reservoir of infection	
a. primary (human; atomization)	1. isolation and quarantine 2. chemotherapy 3. other methods of rendering non-infectious (e.g., tonsillectomy in diphtheria)
(1) droplets	
(2) droplet nuclei	
b. secondary (inanimate; turbulence)	oiling
(1) dust	
(2) lint (bedding, clothes, bandages, etc.)	
2. At susceptibility of individual	1. vaccines and sera 2. chemoprophylaxis
3. At mode of transmission from reservoir to susceptible individual	1. mechanical (physical barriers) a. masks b. partitions c. differential air pressure (controlled currents) d. filters 2. dilution of air 3. reduction in crowding 4. disinfectant radiation a. daylight b. artificial illumination (1) visible light (2) ultra-violet light 5. disinfectant vapors

other methods to render the individual non-infectious). Nor is it concerned with reducing susceptibility of individuals to such infections (vaccines, sera, and chemoprophylaxis). Conversely, it considers its function to extend beyond the scope indicated by the table in that it is definitely concerned with the true relative importance of modes of transmitting infections of the respiratory tract by media other than the air.

The subcommittee plans to present its findings in a series of annual reports (possibly more frequently when indicated), presenting critical summaries of published papers bearing on the problem, and giving specific recommendations as to application of the various control procedures. In this evaluation it will use the technical advice available through other committees of the Association concerned with this problem* and will work closely with comparable committees of other organizations, such as the Committee on Air Sterilization and Odor Control of the American Society of Heating and Ventilating Engineers, the Committee on Air Sterilization of the American Hospital Association, and the Council on Physical Medicine of the American Medical Association.

* Particularly the Laboratory Section's Standard Methods Committee for the Examination of Germicides and Antibacterial Agents with Associate Referees for Disinfection of Air by Germicidal Vapors and Mists (O. H. Robertson), and for Disinfection of Air by Ultra-violet Irradiation (Alexander Hollaender); and the Industrial Hygiene Section's Committee on Standard Methods for Examination of Air, with Subcommittee on Bacteriological Procedures (W. F. Wells, Chairman).

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1,200 Local Public Health Departments for the United States

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LOCAL Health Units for the Nation, published by the Commonwealth Fund in August, represents another milestone in the documentary history of public health in the United States. Noting the slow growth in complete coverage of every person in every county by a minimum framework of local health service, it boldly suggests that the apparatus for delivering such service be redesigned. Recognizing the validity for colonial times of town, village, or city responsibility for the health of their citizens, it points out the present anachronism of some 18,000 local political jurisdictions, ranging in population from eight persons to seven and a half millions, attempting the job of providing the basic local health protection of the people. If one may paraphrase the committee's report, in many areas local public health officials are traveling by covered wagon while the world in general is already in a B-29 era.

In April 1943,* there were outlined the beginnings of the Committee on Local Health Units, whose work now reaches another phase with the publication of the new volume. This article pointed out that both the American Medical Association and the American Public Health Association in resolutions of similar intent had in 1942 expressed "their interest in the complete coverage of the area and population of continental United States by local units of health jurisdiction."

At that time the committee estimated that approximately 40,000,000 of the people of the continental United States were living in communities where local health services had either not been undertaken at all, or, if provided for, were under the direction of part-time and generally untrained or inexperienced health officers with inadequate and often professionally unqualified assistants. This estimate has been substantiated by later inquiry of the committee which warns that "one-third of the nation lives under substandard local health organization, ill-equipped to give basic minimum health protection at all times and to meet public health emergencies quickly and efficiently."

The committee, made up of state and local health officers, representatives of the U. S. Public Health Service and schools of public health, and Foundation representatives, set itself some basic principles for guidance in its proposals for reshaping the administrative architecture of local public health. These principles grew out of the experience of the past and are worth summarizing here:

* Units of Local Health Services for All the States: Progress Report. *A.J.P.H.*, 33, 4:404-409 (Apr.), 1943.

1. No unit of population should be without access to or coverage by the services of a professionally trained and experienced health officer serving on a full-time basis.

2. Local responsibility for public health service is a primary essential of local government and should be so specified under state statute.

3. For administrative efficiency and economy, full-time local health officers should be employed for populations of not less than approximately 50,000 each, which units of population may be made up of single counties, several counties, joint city-county units, or parts of several counties when the natural transportation and trade movements so indicate.

4. The average distance from the headquarters of an area of local health jurisdiction to its periphery should not exceed 25 to 40 miles.

5. In creating units of local health jurisdiction, such factors as per capita income, persons per physician, and number of hospital beds per 1,000 population, should be taken into consideration. In developing district outlines an endeavor should be made to group counties so as to reduce large inequalities of per capita income by combining urban and rural, high and low incomes in a single jurisdiction where otherwise desirable. An attempt should also be made to group counties so that the ratio of physicians will be not less than one to 1,500 of the population and that general hospital beds available be not less than three per 1,000 of the population.

On the basis of these principles and after examination of 1,127 suggested units for the 48 states at the 1942 annual meeting of the American Public Health Association, the committee undertook to reach agreement with state health officers as to such number and boundaries of units proposed for local health administration as would best meet the needs of the respective states. In all but two instances, there was a basis of concurrence between the committee and the state health officer, though in a number of cases agreement upon a tentative plan for districting was qualified in greater or less degree. For two states, Connecticut and Nevada, the committee suggested its own plan without the assistance of the state health officers, neither of whom was willing either to approve the committee's plan or to suggest alternative districting of his own. The agreement of the majority of state health officers with the principles and objectives of the plan was further indicated by a resolution of the Conference of State and Provincial Health Authorities of North America on March 22, 1944, urging the "early implementation of such a program . . . of evolving a plan for complete public health services as projected by the studies of the committee."

The committee proposes a plan whereby the 3,070 counties and their contained cities in the United States can be served by 1,197 units of local health administration. More than three-fourths of the units agreed upon contain populations of 50,000 or more, and only 14 per cent of less than 45,000. These represent the instances in which sparsely populated areas, natural barriers to communication, political incompatibilities among local units of government, or the judgment of the state health officers required substantial variation from the population minimum of 50,000 persons per local health unit suggested by the committee. More than one-fourth of the units include only one county, more than two-thirds are multi-county units; the remaining 5 per cent are made up of city units or of units including parts of one or more counties.

For the 1,197 units the committee undertook to obtain from competent sources of federal, state, and local government, two sets of facts: first the number of full- and part-time employees engaged in tax-supported health services at the local level, according to certain categories of professional and assistant personnel, for each proposed unit of local health jurisdiction, and second the amount expended for the salaries of these persons and the total expenses for local health services within each such suggested unit. The committee's inquiries did not extend to official state and federal personnel and costs except

where these were specifically assigned to local health services, since it was set up to make recommendations for the organization of official public health services on the local level.

The next step was to describe, in terms of persons and dollars of expense, a desirable provision of professional, technical, and lay personnel for each unit with an estimate of total expense, and of that portion required for salaries, such personnel and costs to represent adequacy for good performance of the standard local public health functions, not an optimum or maximum which professional ambition might desire, or which society might, under exceptional conditions of local intelligence, excellence of government, and high per capita wealth, demand and be ready to support.

The committee considers that a community of 50,000 persons or more should be able generally at a cost of approximately $1 per capita to employ the number and quality of persons necessary to assure basic and reasonably adequate local health services as specified immediately below. It is recognized that a larger sum per capita, up to as much as $2 or $2.50 may be needed to provide also such additional services as may be found to be locally desirable and considered to be essential for an optimum local health service of comprehensive scope and superior quality. The six basic functions of a local health department include:

a. *Vital statistics,* or the recording, tabulation, interpretation and publication of the essential facts of birth, deaths, and reportable diseases
b. *Communicable disease control,* including tuberculosis, the venereal diseases, malaria, and hookworm disease
c. *Environmental sanitation,* including supervision of milk and milk products, food processing and public eating places, and maintenance of sanitary conditions of employment
d. *Public health laboratory services*
e. The *hygiene* of *maternity, infancy* and *childhood,* including supervision of the health of the school child
f. *Health education* of the general public so far as not covered by the functions of departments of education

For a community of 50,000 persons there will be needed 1 full-time professionally trained and experienced medical officer of health, 1 full-time public health or sanitary engineer, and a sanitarian of non-professional grade, 10 public health nurses,* one of whom would be of supervisory grade, and 3 persons for clerical work. It is expected that part-time medical services will be needed in most such units of population for diagnosis and treatment of tuberculosis and venereal diseases, and for prenatal, infant, preschool and school health conferences. It is assumed that specialist or consultant and advisory services will be available to such a local health department from the state health department in statistical procedures, in public health engineering, in public health laboratory work, in epidemiology, for veterinary purposes, for dental health, for health education, and for other local health services.

For populations of larger size (viz., 100,000 to 150,000 or over), it may be practicable and economical to include within the staff of the local health department not only additional administrative health officers (chiefs of communicable disease control, maternity and child hygiene, tuberculosis or venereal disease or industrial hygiene), sanitary officers, nurses, and clerical staff proportionate to the size of the population, but to incorporate some or all of the specialized personnel provided for the smaller community only through the

* The committee recommends not less than one public health nurse per 5,000 population for administrative and educational purposes at the local level, not including bedside care of general sickness or maternity patients. If what may be called an inclusive nursing service for a community is to be provided with both administrative public health nursing and bedside care of the sick and maternity patients, not less than one nurse per 2,500 population will be found desirable.

part-time assistance of the staff of the state department of health. It would be expected that the staff of a single local health department for a population unit of 150,000 should include 2 or 3 full-time administrative medical officers, i.e., the commissioner of health or health officer, a chief of division or bureau of communicable diseases, including tuberculosis and venereal diseases, and a chief of division of maternity and child hygiene, including the health of school children; a chief of division of environmental sanitation who would be of professional grade and 5 assistant sanitary officers; 30 public health nurses, of whom 4 would be of supervisory grade; and 10 persons of secretarial and clerical grades, but also 1 statistical clerk or statistician, 1 full-time veterinarian, 3 persons for public health laboratory work (one of professional grade, one technician, and one unskilled assistant), 1 full-time dentist, and 2 full-time dental hygienists, and 1 health educator. Some large communities will wish to add one or more investigators for venereal disease control. Nutritionists and other types of specialists serving as part of the field staff can in larger units of population be included in the quota of public health nursing personnel. There is usually some unskilled and non-technical help employed for operating and maintenance of the health department office, collecting, messenger, and supply services.

These suggestions as to the numbers and proportions of the various categories or personnel for local health departments of different sizes of population and area are intended to serve as a guide for the average community. Wide variations in the needs of the several types of professional, technical, and other personnel are to be expected and will always depend upon peculiarities of local problems, resources, and traditions.

The picture of existing personnel and costs for local health service as administered with more or less success by some 18,000 local jurisdictions, in addition to thousands of local boards of education, is shown in summary form in Table 1. In corresponding columns is shown the minimum personnel that would be required if the administration of local health service, including school health service, were streamlined into the 1,197 units suggested by the committee.

What are the facts? Is there present overstaffing in any category of workers? Only in one area. The committee recommends the elimination of the 4,000 or more part-time medical and lay health officers whom it discovered, and thousands of others who were not reported. The committee is categorical about few of its suggestions but on this subject it says " no equivalent personnel is recommended to replace the reported and unreported part-time local health officers, medical and non-medical, employed in 1942." It suggests rather a full-time medical health officer in each of the units and nearly 900 additional full-time administrative physicians as chiefs of bureaus, as for tuberculosis, venereal diseases, or maternal and child health. It further suggests the use of more than 6,000 local practising physicians for part-time clinical service, recognizing that many states will prefer to employ full-time clinicians.

Fewer than 15,000 public health nurses were employed by official local agencies in 1942; a minimum coverage, not including bedside care of the sick, will require more than 26,000. If bedside care of general sickness and maternity patients is also to be provided in the community, not less than twice as many nurses will be needed. Clerical service in local health departments needs to be expanded from about 5,300 to 8,900 workers. This number will provide 1 clerk per 15,000 population or 1 clerk per 3 nurses.

TABLE 1

Existing and Suggested Personnel and Expenditures for Local Health Services in Continental United States

Personnel for Local Health Services	*Existing (1942)*			*Suggested (Minimum)*		
	Total	*Full-time*	*Part-time*	*Total*	*Full-time*	*Part-time*
Total	40,782	29,201	11,581	63,865	54,357	9,508
Health Officers	5,519	1,202	4,317	1,197	1,197	.....
Other medical administrators	1,065	1,065	.....	866	866	.....
Clinicians, part-time	4,656	.....	4,656	6,145	.....	6,145
Public health nurses	14,274	13,742	532	26,390	26,390	.....
Total sanitary personnel	5,504	4,216	288	5,807	5,796	11
Professionally trained, including engineers, veterinarians	577	539	38	1,895	1,884	11
Sanitarians, not professionally trained, including inspectors of various types	4,927	4,677	250	3,912	3,912	.....
Clerical and secretarial workers, including those with statistical training	5,279	4,830	449	8,933	8,933	.....
Laboratory workers	1,350	1,198	152	3,535	3,535	.....
Professional	321	290	31	431	431	.....
Technical	720	615	105	1,569	1,569	.....
Unskilled	309	293	16	1,535	1,535	.....
Dentists	1,266	307	959	3,789	447	3,342
Dental hygienists	372	318	54	4,267	4,267	.....
Health educators	44	44	.....	543	533	10
Others	1,453	1,279	174	2,393	2,393	.....
Expenditures for Local Health Service						
Total		$77,262,600			$127,391,000	
Per capita		$0.61			$0.97	
Salaries		62,722,600			99,698,500	
Other Expenses		14,540,000			27,692,500	

Total sanitary personnel needs to be increased only slightly for minimum coverage. But the committee, with the full approval of the Engineering Section of the Association, recommends greater professional leadership in this field. Thus it recommends that about one-third of the 5,800 suggested workers have professional training, whereas this was true of only 10 per cent of the workers reported in 1942.

That public health dental service is only in its infancy is indicated by the fact that a substantial increase is recommended in the number of full-time and part-time dentists and dental hygienists. Fewer than 1,300 public health dentists were reported to be engaged in local health services in 1,942, whereas the committee believes that nearly 3,800 are needed—about 450 full-time and 3,300 part-time. In addition, the employment of nearly 4,300 dental hygienists is recommended, whereas only 372 were reported in 1942. The committee points out the economies to be effected by employing dental hygienists for some of the prophylactic and health education functions of a public health dental service, and recommends an analysis of the state licensing laws with a view to making such employment possible.

Only 44 specially trained health educators were reported to be employed in local health services in 1942; the committee recommends nearly 550, chiefly in units with populations of 100,000 or more. In the smaller units, it believes such service must come largely from the state departments of health

unless resources beyond $1 per capita are available.

The committee has laid down no general principles about laboratory service except to indicate the probability that greater economy and efficiency will generally be achieved through branches of the state laboratory than through local health unit laboratories. In 12 states it has suggested no local laboratory service because present plans indicate coverage by the respective state laboratories and their branches. In all other units except those with populations of well over 100,000 it recommends only modest personnel in the expectation that the state laboratory will provide both professional supervision and assistance in the more complicated diagnostic procedures.

This analysis, perhaps the most comprehensive presently available, of official public health personnel in local health departments and the forecast of minimum needs have great significance for the public health professions. Here is an estimate of the least that will be needed in money and personnel to get every citizen of the 48 states and the District of Columbia under the umbrella of full-time local health service. It gives schools of public health, of public health nursing, and of public health or sanitary engineering a basis for estimating their post-war capacities and probable demand for training, and for planning their curricula. It charts for foundations interested in pioneering new paths in public health the areas of immediate need and usefulness. What, for example, might not come out of a few strategic demonstrations of public health dental service, or of integrated public health and school service on a high level of quality? Are there new training techniques to be developed either in public health schools or through the state training centers that have been developed to meet acute wartime personnel shortages?

If, as seems possible, local health departments will be authorized and required by law in the future to assume responsibilities for the diagnosis and treatment of the sick, as well as for the public health care of their citizens, surely there can be no better preparation than to have efficient and economical machinery for delivering whatever services a community desires from its health department. Had such a basic modest organization as is proposed by the committee been everywhere in effect since the last World War would we now be faced with the high rate of rejections for Selective Service?

Also on the horizon of public health responsibilities are the developments that may grow out of bills now in Congress, such as Senate Bill 191 for the construction of hospitals. If such a bill were enacted into law by the Congress there would be built around the concept of a hospital area of about 1,000,000 persons a fully equipped teaching and research hospital with complete diagnostic and treatment facilities, furnishing its expert and specialist services to less fully equipped hospitals and diagnostic centers that might be likened to front line casualty stations. The administrative direction of such a service might be the responsibility of the local health officer. Such an event would challenge the local health officer with new obligations and opportunities.

The population studies of Whelpton and others have already made familiar the pattern of the changing age distribution of the population of the United States and thus the increasing significance of chronic disease for the public health administrator. For example, the median age of the population increased from 26.5 years in 1930 to 29 years in 1940. In the 30 years between 1910 and 1940, persons 45 years of age or over increased from less than one-fifth to more than one-fourth of the total population. Persons in this age group

doubled in number while the total population of Continental United States increased less than 50 per cent. As infant mortality and the diseases of childhood, particularly communicable diseases, are decreased to the lowest attainable levels, thus adding more years of average life expectancy, chronic illness and the diseases of later life, become numerically more important to the public mind and aggravate the difficulty of improving the quality as well as extending the average length of life.

Medical care, hospital service, control of chronic illness—these are but a few of the immediate developments, in addition to already accepted responsibilities, for which local health departments must either develop or streamline their administrative machinery. The committee's report suggests one way in which this may be done. The particular proposal for a given state or a given unit, however, must be considered by the people and their local and state government, as expressing a principle of administration, not a finality for action. Another arrangement of counties and populations may be preferable. The principle of local coöperation, however, and the pooling of community resources in the interest of economy and efficiency are important, and resemble those that have brought about consolidated school districts and road districts serving large areas with engineering adequacy.

Commissioned Corps of U. S. Public Health Service to be Branch of Armed Forces

The commissioned corps of the U. S. Public Health Service will become a branch of the land and naval forces of the United States under an Executive Order signed by President Truman on June 21. The order was effective July 29 for the duration of the war.

Administration of the U. S. Public Health Service is not affected by the Executive Order. The Service continues to operate as a part of the Federal Security Agency. U. S. Public Health Service officers will be subject to the Articles for the Government of the Navy, with authority conferred by the Article and by law on the Secretary of the Navy and the Commander of a fleet vested in the Federal Security Administrator and the Surgeon General of the U. S. Public Health Service. Officers of the U. S. Public Health Service on detail to the Army and Navy, however, will continue to be governed by the laws of the service to which they are assigned.

Under the Executive Order, commissioned officers of the service will be subject to the same discipline and obligations and will have the same status as members of the Army, the Navy, and the Coast Guard. Their post-war status will be the same as that of all other veterans. The order also establishes uniformity in discipline and benefits among Public Health Service commissioned personnel.

The commissioned corps totals 3,175, and is made up of physicians, dentists, sanitary engineers, pharmacists, scientists, and nurses.

Scarlet Fever in Schoolrooms

Outbreaks Due to Serologically Typed Hemolytic Streptococci

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FUNDAMENTAL concepts concerning the epidemiology of infectious disease may be acquired by studying its spread among basic units of population. Chapin [1] was among the first to study the dissemination of scarlet fever in schools. More recently, the importance of the schoolroom in the epidemiology of scarlet fever was reemphasized by the statistical studies of Wilson, Bennett, Allen, and Worcester.[2] Interest in the prevention of air-borne infection by the use of ultraviolet light,[3] by the disinfection of air with aerosol solutions,[4] and by the prophylactic use of the sulfonamides [5] has created a need for further inquiry concerning the spread of disease in hospitals, schools, and other closed population groups.

The differentiation of Lancefield Group A hemolytic streptococci [6] into serological types [7] provided a tool with which the transmission of scarlet fever in schools and similar population groups can be studied with greater accuracy than was possible heretofore. This approach has been applied more widely in England than in this country. Griffith [8] observed that scarlet fever outbreaks in schools are usually due to a single serological type of hemolytic streptococci. De Waal [9] concluded that during the height of an epidemic of scarlet fever which he observed in Edinburgh, the majority of cases occurred among children of school age; and the majority of cases from a given schoolroom were due to the same serological type of hemolytic streptococci.

The schoolroom environment is particularly appropriate for epidemiological investigations concerning scarlet fever. Its population is relatively stable. The introduction of a new type of disease producing hemolytic streptococci may be detected readily. In the classroom it may be possible to define the rôle of the healthy carrier, the missed case, and the convalescent case in the general pattern of spread of the causative organism. Should an outbreak occur, the proportion of scarlet fever cases and their relation to other streptococcal infections due to the same serological type of hemolytic streptococci may be determined with little difficulty. Under certain circumstances, subsequent transmission of the infectious agent may be followed closely not only within the schoolroom but beyond its limits to the family contacts.

During the investigation of a recent schoolroom outbreak of scarlet fever, it was found that all cases were produced by a single serological type (Griffith Type 5) of hemolytic streptococci. Further study revealed that valuable information concerning the epidemiology of scarlet fever could be derived from such investigations. Accordingly, similar research was instituted in other schoolrooms where there was an increased incidence of the disease. It became apparent at once that elementary school classrooms with multiple cases of scarlet

fever could be found in almost any community where the disease was prevalent. This investigation was limited to a small group of schoolrooms in conveniently located communities.

METHODS

Data were obtained from six schoolrooms in four communities (Table 1) during the course of the scarlet fever season of 1943–1944. With one exception (No. 1), the classroom studied in each school was one of several from which multiple cases of scarlet fever had been reported concurrently. The exception (No. 1) was in an elementary school with a total population of 495 children distributed among fourteen schoolrooms. In this school scarlet fever was reported from one room only.

Nose and throat cultures were taken of all children in each room at weekly intervals for periods varying from 4 to 10 weeks. A total of 900 cultures were obtained from 168 schoolroom contacts to 53 cases of scarlet fever and 4 cases of sore throat. As cases occurred, cultures were taken either at home or in the contagious hospital. When convalescent cases returned to school at the expiration of the isolation period their cultures were studied together with those obtained from the contacts; a total of 297 cultures were taken of the 57 cases. Whenever possible, cultures were obtained of the family contacts of the schoolroom cases. As secondary cases occurred among these family contacts, cultures were taken to determine the etiological type of hemolytic streptococci. In addition, nose and throat cultures were obtained from a random sample of the cases occurring in each community to determine the serological types producing scarlet fever during the course of the schoolroom outbreaks.

All contacts were examined periodically for evidence of streptococcal infection. An attempt was made to account for all causes of absenteeism among the children. A record was kept of upper-respiratory infections. Wherever possible Dick tests were performed on the schoolroom contacts.

TABLE 1

Scarlet Fever in Schoolrooms
Serological Types of Hemolytic Streptococci Isolated

Schoolroom	*Population*	*No. Cases of Scarlet Fever*	*Time Range in Days* [1]	*Type of Hem. Streptococci*	*Attack Rate*
1 (Grade 5)	33	11	48	5	33.3
2 (Grade 1)	32	10 [2]	85	2	31.2
3 (Grade 1)	36	12	76	1	33.3
4 (Grade 1)	42	6 [2]	30	2 [3]	14.3
5 (Grade 6)	38	5 [2]	49	2	13.2
6 (Grade 5)	44	9 [2]	23	2 [3]	20.2
Total	225	53			23.5

1. Interval between onsets, first and last case
2. One case of sore throat in addition to scarlet fever
3. Also 2 cases Type 19 (Schoolroom 4), and 1 case Type 19 (Schoolroom 6), included in number of cases of scarlet fever

All nose and throat cultures were streaked on 5 per cent horse blood agar containing 0.5 mg. per cent paraminobenzoic acid.[10] Following incubation for 18–24 hours at 37° C., plates positive for beta-hemolytic streptococci were fished to beef infusion broth. All Lancefield Group A[6] hemolytic streptococci were classified as to serological type by the slide-agglutination method of Griffith.[7] Classification of self-agglutinating or granular cultures was facilitated by digestion with trypsin as described by Allison.[11]

RESULTS

A. Cases

A single serological type of hemolytic streptococci was isolated from the scarlet

fever cases occurring in each of four of the six schoolrooms (Table 1). In both of the remaining classrooms two serological types were involved. In schoolroom No. 4 there were 4 cases of Type 2 and 2 cases of Type 19, while in schoolroom No. 6 there were 8 cases of Type 2 and a single case due to Type 19. The latter infection was traced to a playmate, a recently recovered scarlet fever patient from whom Griffith Type 19 hemolytic streptococci were recovered.

Study of the distribution of cases according to time of onset revealed a range of from 23 days between the first and last case in schoolroom No. 6, to 85 days in schoolroom No. 2. In two small institutional outbreaks recently investigated by the authors, the range of onsets was 10 days in the first (14 cases in an orphanage), and 8 days in the second (11 cases in a home for blind children). Apparently the interval between cases in this type of institution tends to be less than in a schoolroom. Similarly, in family units, the majority of cases have their onset within a relatively short space of time. In this sense, environmental factors in the home as they relate to the spread of scarlet fever appear to be similar to those in an institution in which children live in close proximity to each other.

The attack rates in the six schoolrooms varied from 13 to 33 per cent (Table 1). Among the total population of 225 children, 53 or 23 per cent, developed scarlet fever. The similarity in the individual attack rates is even more apparent when the computations are based upon the number of Dick-positive children rather than on the total population. These attack rates ranged from 24 to 41 per cent (Table 2).

It will be noted (Table 2) that the figures for the number of Dick-positive children have been adjusted to correct for the few contacts whose Dick status was not known. This was done by assuming that the percentage of positives among the untested children was the same as that observed in the tested group. Statistical analysis of both sets of attack rates revealed no significant differences among them, suggesting that the risk of acquiring scarlet fever was equally great in all six rooms.

The adjusted figures also were used in computing the ratio of scarlet fever cases to Dick-positive children. There appeared to be a fairly constant relation between these two variables in each schoolroom (Table 2). The ratios of cases to Dick-positives varied from 1:2.4 to 1:4.2 with a mean of 1:3. The results were not altered materially when the observed rather than the adjusted number of Dick-positives was used in computing the ratios.

The ratio of cases to Dick-positives in the two institutional outbreaks previously mentioned was 1:2.3 and 1:2.8

TABLE 2

Scarlet Fever in Schoolrooms
Attack Rates Among Dick-Positive Children

		Dick Tests				Corrected	Corrected	Corrected
Schoolroom	*Population*	*No. Tested*	*No. Unknown*	*No. Dick-Positive*	*% Dick-Positive in Tested Group*	*No. Dick-Positives*	*Attack Rate*	*Ratio—Cases: Dick-Positives*
1	33	31	2	25	80.6	27	40.7	1:2.4
2	32	27	5	25	92.5	30	33.3	1:3.0
3	36	27	9	25	92.5	33	36.3	1:2.7
4	42	32	10	16	50.0	21	28.6	1:3.6
5	38	32	6	18	56.2	21	23.8	1:4.2
6	44	38	6	23	60.5	27	33.3	1:3.0
Total	225	187	38	132	70.5	159	33.3	1:3.0

Corrected attack rates derived from: Cases Dick-Positives
Dick-Positive totals include cases

respectively. Despite differences in distribution by time of onset of the cases in the schoolrooms and the two institutional outbreaks, approximately one-third of the exposed Dick-positive children came down with scarlet fever.

During the period of observation only 4 (0.66 per cent of the Dick-negative children) manifested evidence of streptococcal infection other than scarlet fever due to the serological type involved in each classroom. Considering the high scarlet fever attack rates in the individual rooms, the latter figure seems surprisingly low.

B. Contacts

1. *Schoolroom Contacts*—The carrier rates for all serological types of hemolytic streptococci throughout the entire period of observation were high; varying from 28 to 91 per cent in the individual schoolrooms. However, except for one schoolroom (No. 1) the number of contacts who harbored the etiological type in each room was small, from 1 to 4 children (Table 3). In schoolroom No. 1, 10 of 22 healthy contacts had cultures positive for Griffith Type 5 hemolytic streptococci. Ventilation studies in this room revealed that 20 per cent of the air was being recirculated through a heating-ventilating unit. This factor may have been responsible for the widespread dissemination of the organism in this room.

Of the healthy children, none carried the serological type of hemolytic streptococci which was responsible for scarlet fever cases in a particular classroom for more than 4 weeks. However, many of the convalescent cases continued to have positive cultures for 2 and even 3 months. At times a non-disease producing type of hemolytic streptococci was more widespread among the contacts in an individual schoolroom than the organism which was causing scarlet fever. Dick status did not appear to affect the duration of the carrier state in the healthy child.

Of the 168 pupil contacts of the 53 cases of scarlet fever 106 (63.1 per cent) had positive Dick tests. Although 11 (10.3 per cent) of these harbored the serological type of hemolytic streptococci involved in the particular schoolroom, they did not develop scarlet fever.

2. *Family Contacts*—Study of 78 family contacts of the 53 cases revealed that 43 (55.2 per cent) harbored the serological type of hemolytic streptococci which had been incriminated in the respective classroom (Table 4). There were 19 secondary cases among these family contacts, giving a secondary attack rate of 35.8 per cent. In each instance the serological type of hemolytic streptococci isolated from the secondary case was the same as that causing scarlet fever in the corresponding schoolroom.

A significantly greater proportion of the healthy family contacts (24 or 40.7

TABLE 3

Scarlet Fever in Schoolrooms
Spread of Etiological Types Among Contacts

Schoolroom	No. Contacts *	Total No. Cultures	No. Positive for Hem. Streptococci (all types)	Per cent Positive	No. Positive for Etiological Type: 1st Week	%	Total Period	%
1	22	220	20	90.9	10	45.4	10	45.4
2	21	84	8	38.9	1	4.8	4	19.0
3	24	96	11	45.8	2	8.3	3	12.5
4	35	140	12	34.3	1	2.8	1	2.8
5	32	224	16	50.0	1	3.1	2	6.2
6	34	136	9	26.5	2	5.9	4	11.7
Total	168	900	76	45.2	17	10.1	24	14.3

* Total population less scarlet fever and sore throat cases

TABLE 4

Scarlet Fever in Schoolrooms
Family Contacts and Secondary Cases

Schoolroom	No. Primary Cases	Family Contacts: No. Studied	Family Contacts: No. Positive for Etiological Type	Family Contacts: No. Secondary Cases	Other Serological Types Producing Scarlet Fever in Community at Time *
1	11	20	13 (Type 5)	5	2, 1, 6
2	10	18	11 (" 2)	2	17–23, 8, 6, 2, 1
3	12	3	2 (" 1)	5†	2, 1, 8, 6, 19/24
4	4	6	3 (" 2)	2	19/24, 1, 17/23
5	5	9	8 (" 2)	4	19/24, 1, 17/23
6	8	22	6 (" 2)	1	19/24, 1, 17/23
Total	50‡	78	43 (55.2%)	19 (24.3%)	

* Strains isolated in order of frequency during course of schoolroom outbreak
† Only 2 cases studied bacteriologically
‡ Three Type 19 cases not included since family contacts not studied

per cent of 59) than the schoolroom contacts (24 or 14.3 per cent of 168) had nose and throat cultures positive for the serological type of hemolytic streptococci producing scarlet fever. This suggests greater dissemination of the infecting organism in the family than in the schoolroom.

CONTROL MEASURES

In four of the schoolrooms the outbreaks subsided spontaneously. There was no intervening vacation period which might have interfered with the spread of scarlet fever. Control measures were attempted in two of the schoolrooms. In schoolroom No. 1, the noses and throats of contacts were sprayed with Pickrell's Solution (2½ per cent sulfadiazine in a solution of ethanolomines) twice daily for 2 weeks as a prophylactic measure.[12] However, it is questionable whether this procedure influenced the course of the outbreak.

In schoolroom No. 6 both cases and contacts whose nose and throat cultures were positive for the etiological type of hemolytic streptococci were excluded from school until their cultures became negative. The duration of the outbreak —interval between the first and last case (Table 1)—was 23 days, only slightly less than that of the outbreak in schoolroom No. 4 which subsided in 30 days without control measures.

DISCUSSION

When multiple cases of scarlet fever occur in a schoolroom, a single serological type of hemolytic streptococci is usually the etiological agent. Should two types appear concurrently, one or the other will predominate ultimately. This type predominance exists in the schoolroom despite the occurrence throughout the community of scarlet fever due to a variety of serological types. The schoolroom outbreaks in this respect are analogous to those in institutions [13] and in families.[14]

The frequent occurrence of multiple cases caused by the same organism is further evidence that the schoolroom is a significant factor in the epidemiology of scarlet fever. The transfer of infection to pupil contacts and family contacts tends to maintain lines of spread. The high attack rates, both in the schoolroom and in the family, indicate how readily dissemination may take place.

Outbreaks of streptococcal infection in institutions usually can be traced to the introduction of a single serological type of hemolytic streptococci not previously present in the population.[15] The recovery of the same serological type from multiple cases of scarlet fever in the same household[14] and in schoolrooms suggests a similar series of events.

Utilizing serological classification as

an aid in epidemiological investigation, it is possible to trace chains of spread in basic population units. In the outbreaks reported here, it was found that convalescent carriers and missed cases constitute a significant source of infection. With but few exceptions, it was noted that convalescent cases, upon their return to school at the expiration of the isolation period, still harbored the infectious agent in the nose and throat.

As pointed out by Darling and Gordon,[16] the problem of hemolytic streptococcus "carriers" is confused by using the word to include (a) the so-called healthy carrier, (b) the subclinical or missed case, and (c) the convalescent case. In the past the significance of the subclinical or missed case and the convalescent case has been minimized, while the rôle of the "healthy carrier" as a potential source of infection may have been overemphasized. The term "healthy carrier" often included individuals who more properly should have been considered in one of the other categories.

In attempting to relate carrier rates prevailing in a community to the occurrence of an epidemic, it is important that those actually infected be distinguished from the temporary "healthy carrier." When this is done, there actually is little but empirical evidence to support the view that an increased carrier rate precedes the appearance of cases.[17]

There was no rise in the carrier rate when cases began to appear in the outbreaks of streptococcal pharyngitis reported by Bloomfield and Felty.[18] Kuttner[15] found that major outbreaks of streptococcal infections usually are not caused by streptococcal carriers already present in the community.

Similarly, in the studies reported here, there were remarkably few carriers of the epidemic type of hemolytic streptococci in each of the schoolrooms except among those children who could be classified as missed or convalescent carriers. In a previous experience with an outbreak in a small country orphanage, the population became saturated with the scarlet fever producing type of hemolytic streptococci in a relatively short time. However, as regards the relationship between case and carrier, cause could not be distinguished from effect.

The absence of streptococcal disease, other than scarlet fever, was a striking characteristic of these schoolroom outbreaks. Griffith[8] reported a high incidence of scarlet fever in schools where other streptococcal disease due to the same type of hemolytic streptococci also was prevalent. On the other hand, the reverse (high scarlet fever attack rates with low rates for other streptococcal infections) also has been reported.[19]

The Dick-negative children in the six schoolrooms remained relatively free of streptococcal infection. Further studies are essential to determine whether or not this was a chance finding in a relatively small sample. If, in a larger series of schoolroom studies, it is found that Dick-negative children succumb to streptococcal infections other than scarlet fever as frequently as Dick-positive children to scarlet fever, then the dispute concerning the efficacy of immunization with the Dick toxin could be clarified. On the other hand, if such research proves that large numbers of Dick-negative children regularly escape infection during streptococcal outbreaks in which scarlet fever predominates, a new significance could be given to immunization with Dick toxin as a method of controlling schoolroom scarlet fever, with consequent reduction in absenteeism.

The percentage of Dick-positive children in each schoolroom (Table 2) varied considerably in the six classrooms. It will be noted that there were

more Dick-positives among some of the older children than among the younger ones. Anderson [20] noted that the percentage of Dick-positives in any given age group is influenced by the characteristics of the community from which the sample is drawn; rural or semi-rural populations yield a higher percentage of Dick-positives than urban populations with the same age distribution.

As Schwentker, Janney, and Gordon point out,[21] only a proportion of those who acquire the epidemic strain during an outbreak of streptococcal disease become clinically ill. The available data indicate the existence of some unknown factor which protects a certain proportion of those exposed irrespective of Dick status. It will be recalled that of the 225 children studied, 159 (70.7 per cent) had positive Dick tests. Among this group there were 106 who escaped the infection. Of these, 11 (10.3 per cent) children harbored the same serological type of hemolytic streptococci that was producing scarlet fever in other susceptibles.

It is expected that further study along the lines indicated in this report may aid in solving some of the problems concerning streptococcal disease. Because the schoolroom is a ready source of streptococcal infection, it demands an increasing degree of attention in future research.

SUMMARY

1. Study of multiple cases of scarlet fever in six schoolrooms located in four different communities revealed a predominant type of hemolytic streptococci as the etiological agent in each classroom.

2. In four classrooms a single type of hemolytic streptococci was isolated from all cases occurring in each room while from both of the remaining rooms only two types were recovered.

3. Of the total population of 225 children in the six schoolrooms, 53 (23 per cent) developed scarlet fever. Individual attack rates in each classroom ranged from 13 to 33 per cent, while the ratio of scarlet fever cases to Dick-positive children varied from 1:2.4 to 1:4.2, with a mean of 1:3. Of the remaining Dick-positives 11 (10.3 per cent) harbored the serological type of hemolytic streptococci producing scarlet fever in other children but did not develop clinical symptoms.

4. During the course of the study the incidence of other streptococcal disease due to the serological type of hemolytic streptococci producing scarlet fever in the respective schoolrooms was 0.66 per cent.

5. In five of the schoolrooms only a small number of contacts became carriers of the etiological type. In the sixth classroom the etiological type was isolated from the noses and throats of 10 of 22 healthy children. This room was using recirculated air.

6. Study of 78 family contacts of 53 scarlet fever cases revealed that 43 (55.2 per cent) harbored the same serological type of hemolytic streptococci which had been incriminated in the respective schoolrooms. There were 19 secondary cases among these family contacts, giving a secondary attack rate of 35.8 per cent.

7. There was significantly greater dissemination of the etiological types among the family contacts than among the schoolroom contacts of the cases in each schoolroom.

8. Control measures were instituted in two of the schoolrooms. Prophylactic application of a sulfonamide spray was utilized to protect the contacts in one schoolroom and exclusion from school of cases and contacts harboring the etiological type was tried in the other. Although no further cases appeared in either of these schoolrooms it is questionable whether or not this was a direct result of the control measures. The four remaining outbreaks subsided spontaneously.

9. The frequent occurrence of multiple cases of scarlet fever due to a predominant type of hemolytic streptococci in schoolrooms, and the subsequent transfer of infection to the family contacts, is further evidence of the significance of the schoolroom in the transmission of scarlet fever.

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Infant Mortality in Relation to Month of Birth

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THE problem of infant mortality has been studied intensively during recent decades but one phase of the subject still lacks adequate investigation. This concerns the influence that season of birth has on the chance of survival to the first birth anniversary. Hitherto, attempts to study this relationship have been confined largely to computations based on the number of deaths under 1 year of age in a given month related to the number of live births reported in that same month. Obviously, this method is little more than a makeshift, since babies dying under 1 year in any calendar month have been born at various times during the preceding year, and so have a limited relationship to the births recorded in that month. The correct approach to the problem is to trace the deaths that actually occurred among a group of babies born in a specified month. In this way it is possible to discover not only the most favorable birth month from the standpoint of survival to the first birthday, but also to learn how this chance of survival is affected by certain diseases and conditions that accompany the cyclic round of the seasons.

Until recently, the basic data for such a study were not available in published reports of vital statistics. The U. S. Bureau of the Census *Annual Reports of Births, Stillbirths and Infant Mortality* for the years 1935 to 1937, however, contain certain statistical material that helps to supply this want. In the appendix to this article will be found a full description of this material and the manner in which it has been utilized in the construction of the accompanying tables. These tables will show, first, the mortality from all causes in the first year of life among infants born in each month of the year during the period 1935 to 1937, and then in greater detail the principal causes of death and some of the factors involved.

Table 1 exhibits for children born in each calendar month, the mortality from all causes combined at each successive month of age. That the season of birth is definitely related to the subsequent health of babies is here clearly apparent. A glance at the table shows that August babies have the best chance of surviving to their first birthday, while next in order are those born in September and July. The least favorable months of birth are January, December, and February. Babies born in January suffer a mortality rate in their first year about 15 per cent greater than August babies.

This is chiefly due to the very high mortality of January infants in the first 4 months of life. The winter months are especially severe on very young babies. If, however, the January child manages to survive the rigorous conditions of winter and early spring, his health outlook for the balance of his first year of life compares favorably with that of babies born in other seasons who have reached the age of 4 months. In fact, the January infant of that age has a distinctly better prospect of celebrating his first birthday than has a 4 months old child born in August. The reason for this is that the January child,

TABLE 1

Death Rates from All Causes per 100,000 at Specified Ages among Infants Born in Each Calendar Month—United States. 1935–1937 Inclusive

	Month of Birth											
Age at Death in Months	*Jan.*	*Feb.*	*Mar.*	*Apr.*	*May*	*June*	*July*	*Aug.*	*Sept.*	*Oct.*	*Nov.*	*Dec.*
Total Under 1 Year	6,011	5,766	5,459	5,560	5,476	5,496	5,303	5,214	5,258	5,441	5,650	5,894
Months												
Under 1	3,513	3,443	3,315	3,366	3,303	3,193	3,051	2,881	2,846	3,049	3,176	3,420
1	631	506	428	394	361	375	350	376	425	422	525	560
2	422	354	294	327	305	298	312	360	359	408	455	441
3	306	264	244	269	248	280	290	294	338	357	361	314
4	219	240	237	218	229	264	245	259	285	279	243	227
5	199	215	199	191	210	209	215	237	232	208	195	191
6	208	182	167	188	174	199	**228**	220	195	169	164	**197**
7	159	153	147	139	165	**201**	194	171	153	142	**165**	168
8	141	138	122	**150**	**170**	189	150	148	146	**161**	151	153
9	128	113	**124**	157	159	151	140	133	138	139	131	128
10	103	**116**	140	138	130	120	115	120	130	107	104	99
11	103	149	137	123	119	116	115	112	111	104	93	84

having survived the rigors of winter and spring, faces relatively healthful conditions for the rest of the year, whereas the August baby of 4 months is only just about to encounter the very conditions that have been a hazard to the early life of the January baby.

As a general rule, the mortality of infants decreases with each successive month of age. The decline, however, tends to be interrupted or retarded when the children encounter the trying conditions of winter. February babies, for example, show a rise in mortality at 10 months of age; March infants at 9 months; April infants at 8 months, etc., up to those born in July who show an increase in mortality at the age of 6 months. The pertinent figures have been printed in bold face type in the table and are seen to run essentially in a diagonal direction from left to right. They show that in December, with the approach of winter, the infant death rate rises among children born in the first half of the year. Among babies born in August and later months, no such rise in mortality is recorded with the advent of winter but the decline which would ordinarily occur with increased age is very much slowed down. A similar trend, although to a much less extent, is discernible when the child encounters the gastrointestinal diseases of summer. Note that the October child at 8 months; the November child, at 7 months; and December and January infants at 6 months, all show temporary rises in mortality early in the following summer.

ANALYSIS BY CAUSE OF DEATH

It is clear that season of birth has a decided bearing on the subsequent health of infants and their chance of surviving the first year of life. The question naturally arises—what are the diseases and conditions chiefly involved in this relation?

The principal causes of infant mortality may for our present purpose be broadly classified into 5 groups, namely:

1. The prenatal causes, which comprise premature births, congenital malformations and congenital debility.
2. The natal and neonatal group, which includes injury at birth and "other diseases peculiar to early infancy."
3. The respiratory diseases, chiefly influenza and pneumonia.
4. The gastrointestinal group, which covers diarrhea and enteritis, dysentery and "other diseases of the stomach."
5. All other diseases and conditions; among which the more important are whooping cough, syphilis, accidents, and those of ill-defined origin.

PRENATAL CAUSES

Chief among the causes of infant mortality are those of prenatal origin. Of infant deaths from prenatal causes about 70 per cent are chargeable to premature birth, 21 per cent to congenital malformation, and 9 per cent to congenital debility. Babies born in winter and spring show the highest death rate from these causes and, to a large degree, this reflects the harmful effects on both mother and unborn child of the diseases most prevalent in winter. The effect is seen not only in the seasonal mortality due to premature birth and congenital causes but also in the seasonal distribution of stillbirths. The ratio of stillbirths to live births is about 12 per cent greater in spring than it is in midsummer. Thus, in 1935–1937 the seasonal ratio of stillbirths per 1,000 live births was as follows:

Stillbirths per 1,000 Live Births

January	36.0	July	32.9
February	35.5	August	31.9
March	35.7	September	32.3
April	36.1	October	34.1
May	36.2	November	35.1
June	35.0	December	33.9

Probably no single circumstance is responsible for this phenomenon but a controlling factor would seem to be the health hazards of winter and early spring for pregnant women. That weather conditions at this time of the year do seriously impair the health of expectant mothers is clearly indicated by the seasonal mortality from puerperal causes. During the period under study, 1935–1937, maternal mortality rates per 10,000 total deliveries averaged about 28 per cent higher during the first 4 months of the year than in the 4 months of August, September, October, and November.

Winter is the season when most of the communicable diseases reach their highest prevalence, particularly those which attack the respiratory system. The presence of an epidemic of even mild influenza is inevitably accompanied by an increase in deaths from all types of pneumonia. "Past experience has demonstrated that influenza is especially hazardous for the parturient, and a decided tendency to early miscarriage, in the course of an influenza, has a most serious effect in increasing the deaths from the respiratory infections." [1]

During attacks of influenza in pregnant women, according to Adair, the gestation is interrupted spontaneously in from 35 to 60 per cent of all the cases. "Most of the interruptions take place during the later months, especially near term. When pneumonia complicates grippe, the termination of pregnancy is much more frequent than otherwise." [2] It is not surprising, therefore, that the rates of stillbirths and infant deaths due to premature birth are particularly high during the early months of the year when the respiratory infections are at their peak. Since premature births dominate in the group of prenatal causes, any seasonal factor that would tend to increase appreciably the number of premature births would have con-

TABLE 2

Death Rates from Prenatal Causes per 100,000 at Specified Ages among Infants Born in Each Calendar Month—United States, 1935–1937 Inclusive*

	Month of Birth											
Age at Death in Months	*Jan.*	*Feb.*	*Mar.*	*Apr.*	*May*	*June*	*July*	*Aug.*	*Sept.*	*Oct.*	*Nov.*	*Dec.*
Total Under 1 Year	2,252	2,224	2,184	2,326	2,396	2,321	2,191	2,053	2,017	2,101	2,204	2,283
Under 1 Month	1,975	1,948	1,941	2,050	2,128	2,027	1,905	1,787	1,733	1,849	1,947	2,027
1 Month	111	100	88	97	88	100	101	97	118	95	100	96
2 Months	49	54	44	59	62	58	62	64	56	55	52	49
3 Months	34	36	30	39	34	41	38	32	36	32	31	33

* Premature Birth, Congenital Malformation and Congenital Debility

NOTE: The table has not been carried beyond the age of 3 months because the figures for older ages are too small to be significant.

siderable weight in raising the mortality from prenatal causes generally.

Since 1935–1937, the period of this study, the treatment of pneumonia has been revolutionized by the new sulfa drugs and by penicillin. At present there are no data that enable us to measure the indirect effect of this new therapy on maternal and infant mortality. The interval since 1937, however, has been marked by significant gains in both of these fields and it would not be surprising to learn that a substantial part of these gains were attributable to this new treatment.

There is another factor that may play an important part in raising the mortality from the prenatal causes during the winter and spring months. Recent investigation seems to indicate that faulty nutrition in expectant mothers tends to increase the number of abortions, premature births, and malformed offspring. It is probably that in many sections of the country, particularly in the rural areas, the diet available in winter and spring is inferior to that enjoyed at other seasons of the year. In such sections, the lack of riboflavin and other essential elements in the winter diet of expectant mothers may be partly accountable for the rise in prenatal deaths in April and May.

The preponderance of premature births in this group of causes is indicated by the large proportion of deaths in the first month of life, 88 per cent of those dying under 1 year of age.

NEONATAL CAUSES

About 70 per cent of all infant deaths from neonatal causes are attributable to injuries at birth. Consequently, we can hardly expect to find marked seasonal variation in this group of causes. Nevertheless, babies born in summer do have a better chance of escaping the hazards of birth than do those born in winter. According to Table 3, September babies suffer a neonatal death rate of 592 per 100,000 as compared with a rate of 682 for January infants. It is unthinkable that obstetricians are less skillful or more careless in winter than in summer. Perhaps the explanation lies in the fact that a substantial proportion of deaths due to injury at birth (about 28 per cent) are among premature infants; and prematurity, we have seen, is more frequent in winter than in summer.

TABLE 3

Death Rates from Natal and Neonatal Causes per 100,000 at Specified Ages among Infants Born in Each Calendar Month—United States, 1935–1937 Inclusive*

	Month of Birth											
Age at Death in Months	*Jan.*	*Feb.*	*Mar.*	*Apr.*	*May*	*June*	*July*	*Aug.*	*Sept.*	*Oct.*	*Nov.*	*Dec.*
Total Under 1 Year	682	676	660	653	638	632	639	593	592	619	623	677
Under 1 Month	670	660	646	643	629	624	629	582	583	605	609	661

* Injury at Birth and "Other Diseases Peculiar to Early Infancy"

NOTE: The table has not been carried beyond the age "under 1 month" for the reason that figures for older ages are insignificant.

RESPIRATORY DISEASES

The respiratory diseases, chiefly influenza and pneumonia, are a concomitant of cold and unsettled weather and are particularly fatal to very young children. It is not surprising, therefore, to find that January babies suffer excessive mortality from these diseases, especially in the first 4 months of life. As the weather becomes milder the respiratory death rate declines, reaching its lowest point at each month of age in midsummer. With the reapproach of winter it rises again, attaining a peak in January. For example, December babies suffer their highest mortality from

TABLE 4

Death Rates from Respiratory Diseases per 100,000 at Specified Ages among Infants Born in Each Calendar Month—United States. 1935–1937 Inclusive*

	Month of Birth											
Age at Death in Months	*Jan.*	*Feb.*	*Mar.*	*Apr.*	*May*	*June*	*July*	*Aug.*	*Sept.*	*Oct.*	*Nov.*	*Dec.*
Total Under 1 Year	1,138	964	804	784	728	775	804	872	934	1,000	1,085	1,085
Months												
Under 1	317	281	204	165	108	85	80	74	92	127	169	215
1	274	177	127	94	56	44	39	48	80	118	201	**244**
2	187	136	75	55	36	34	41	83	107	166	**221**	214
3	126	79	48	35	31	46	67	100	152	**181**	185	144
4	65	45	29	27	33	55	78	119	**151**	144	115	96
5	31	29	24	30	48	72	101	**134**	125	104	82	62
6	24	24	28	46	65	98	**130**	122	96	74	47	35
7	20	21	34	55	81	**110**	114	88	64	46	29	22
8	19	32	46	76	**97**	97	78	63	48	27	18	20
9	29	40	66	**90**	89	78	59	40	23	16	18	19
10	34	58	**77**	82	63	52	32	21	17	17	18	22
11	50	**71**	74	59	51	37	18	14	14	17	21	31

* Influenza and Pneumonia (all forms)

these diseases at 1 month of age, that is, in January; November babies' highest death rate is reached at 2 months of age; October babies at 3 months, etc. It is interesting to observe that this January peak becomes progressively lower with the advanced age of the children that have survived to that month. This can be seen by reading diagonally downward from right to left. The January peak among December infants is 244 per 100,000; among November infants, 221; among October babies, 181; and so on down to 110 among June children at the age of 7 months.

The May baby experiences the lowest mortality from the respiratory diseases chiefly because it faces at birth a season when these diseases are at a minimum and so it is not much subject to influenza or pneumonia infection until the following winter when it has attained an age at which it is better constituted to withstand this hazard.

The relation of season to the mortality from respiratory disease in infancy is well illustrated by Table 4A. It is designed to show the mortality, not among infants born in each of the specified months, as presented in the other tables of this study, but among those living at each age period in January and August respectively. In the first place, it is clear, the younger the child, the greater is the risk of death from these diseases. In the second place the mortality in August from respiratory affec-

TABLE 4A

Comparison of the Age Specific Death Rates per 100,000 from Respiratory Diseases among Children Living at Each Month of Age in January and in August—1935–1937

Age	*January*	*August*	*Per cent August of January*
Months			
Under 1	317	74	23.3
1	244	39	16.0
2	221	34	15.4
3	181	31	17.1
4	151	27	17.9
5	134	24	17.9
6	130	24	18.5
7	110	20	18.2
8	97	20	20.6
9	90	18	20.0
10	77	17	22.1
11	74	14	18.9

tions seldom rises above one-fifth of that recorded in January in the corresponding age group. Similar comparisons for other months can be made by returning to Table 4 and following the precedure described above, that is, by reading diagonally downward from right to left, beginning with the month chosen for comparison. It will be noted that in any particular calendar month, the respiratory diseases are most fatal among the new-born infants and become less so with each added month of age.

GASTROINTESTINAL DISEASES

Although in general the mortality of infants is highest among the new-born and decreases with each added month of age, the rule is inapplicable to the gastrointestinal group of diseases, particularly at certain seasons of the year. Excepting those born in September and October, the peak of mortality comes, not in the first month of life but at later ages when the child becomes exposed to the epidemic form of diarrhea and enteritis in the warm months of the year. But even in such months as June, July, and August, when these diseases are at their height, the greatest mortality is not registered among very young infants but among those 2 to 3 months of age. Apparently the new-born receive certain protection not afforded those of older age. Since these digestive disorders are primarily due to faulty feeding, the logical explanation of the relative immunity enjoyed by the new-born baby lies in breast feeding. A month or two later in life, when he is weaned or begins to receive supplemental food, he becomes more susceptible to the gastrointestinal diseases. This is why babies born in July and August exhibit the highest mortality from these diseases, not in July and August when these diseases are most prevalent, but in September and October after the seasonal peak has passed, and why it is not among babies born in summer that we find the greatest mortality from these disorders but among those born earlier in the year, in April, May, and June. The October or November baby stands the best chance of escaping death from the digestive diseases because he does not encounter them to any marked degree until the following summer when he will be 7 or 8 months old and his feeding habits have become more or less established.

The seasonal character of the gastrointestinal diseases is well shown in Table 5A. As in Table 4A this table shows not the mortality among babies

TABLE 5

Death Rates from Gastrointestinal Diseases per 100,000 at Specified Ages among Infants Born in Each Calendar Month—United States, 1935–1937 Inclusive*

	Month of Birth											
Age at Death in Months	*Jan.*	*Feb.*	*Mar.*	*Apr.*	*May*	*June*	*July*	*Aug.*	*Sept.*	*Oct.*	*Nov.*	*Dec.*
Total Under 1 Year	628	634	630	635	635	653	599	601	581	556	554	594
Months												
Under 1	63	55	62	66	66	86	87	89	**94**	**88**	64	72
1	47	48	51	63	79	103	95	106	93	64	51	49
2	38	43	53	96	**113**	**110**	**111**	**109**	71	44	37	34
3	39	58	87	**105**	111	111	98	64	37	33	25	33
4	57	96	**112**	95	103	100	57	32	27	25	25	29
5	88	**102**	96	85	79	53	25	21	20	21	30	56
6	**97**	88	77	73	40	19	19	20	24	26	59	**88**
7	82	74	54	30	17	16	16	18	21	41	**77**	84
8	68	50	26	16	12	16	13	23	38	**78**	72	72
9	48	22	14	11	12	15	19	38	**63**	64	61	59
10	21	11	11	10	11	17	31	**83**	64	50	48	29
11	10	15	13	10	16	31	**49**	49	50	44	30	16

* Diarrhea and Enteritis, Dysentery and "Other Diseases of the Stomach"

TABLE 5A

Comparison of the Age Specific Death Rates per 100,000 from Gastrointestinal Diseases among Children Living at Each Month of Age in January and in July—1935–1937

Age	January	July	Per cent January of July
Months			
Under 1	63	87	72.4
1	49	103	47.6
2	37	113	32.7
3	33	105	31.4
4	27	112	24.1
5	21	102	20.6
6	19	97	19.6
7	16	84	19.0
8	12	72	16.7
9	11	64	17.2
10	11	64	17.2
11	15	49	30.6

born in the specified months but among those living in those months.

The age distribution of the mortality from the digestive disorders recorded in January follows the established order but that for July is much distorted, showing a peak not among the new-born but at the age of 2 months. January babies under 1 month of age die at a rate 72 per cent of that recorded in July for infants of that age. At 2 months of age the January mortality rate is less than one-third of that for July, while at 8 months of age it is only one-sixth of the July rate.

ALL OTHER CAUSES

This class comprises a wide variety of conditions, the chief component being a group reported under the general designation of "Unknown or Ill-defined Causes." It includes such other causes as accidents, whooping cough and other communicable diseases of childhood, syphilis, tuberculosis, etc. With such a heterogeneous group one would not expect to find clearly defined seasonal or age distribution patterns. Yet here again the lowest mortality rates are found among May, July, and August babies, and the highest among those born in December, January, and February. Also, consistently high death rates prevail among those under 1 month of age with gradually reduced rates in each of the next 3 months of life. The mortality of winter new-born infants is much higher than those born in summer. February children, for example, succumb to these causes in the first month of life at a rate 45 per cent greater than children born in September. In the later months of the first year of life, there are no very definitely ordered differentials, and Table 6 accordingly is carried out only for the first 3 months.

TABLE 6

Death Rates from All Other Causes per 100,000 at Specified Ages among Infants Born in Each Calendar Month—United States. 1935–1937 Inclusive

	Month of Birth											
Age at Death in Months	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
Total Under 1 Year	1,312	1,266	1,180	1,162	1,079	1,115	1,070	1,096	1,135	1,165	1,184	1,255
Months												
Under 1	488	499	462	442	372	371	350	349	344	380	387	445
1	190	169	151	137	132	122	108	117	128	136	163	186
2	145	116	119	114	91	94	95	101	122	138	138	141
3	107	91	79	90	72	82	87	98	113	111	120	104

NOTE: The table has not been carried beyond the age of 3 months because the group is so heterogeneous that the figures for later ages have no significance.

SUMMARY

To summarize—babies born in summer and early autumn have a distinctly better prospect of celebrating their first birthday than have those born at other times of the year. These summer and fall babies, for the most part, were conceived during October, November, and December of the preceding year, when their parents' health was at a peak following the beneficial effects of summer. It is therefore possible that as a class these babies are better endowed to survive the rigors and hazards of the first year of life than are those conceived in spring. But it would seem that the chief cause of the wide differences between the death rates of summer and winter babies is the seasonal distribution of the communicable diseases, particularly those that affect the respiratory system.

Not only are the respiratory diseases especially dangerous to very young babies, but through their deleterious effects on the health of expectant mothers they are no doubt also indirectly responsible for a large part of the excessive mortality among unborn infants during late winter and early spring, the season when these diseases are most prevalent. The infant born at this time of the year is not only more likely to be born dead and prematurely than the summer baby, but it also faces the special hazard of respiratory infection at an age when it is least able to resist it.

The summer child, in its first few months of life, also faces a special hazard—that of infantile diarrhea. But this disease, thanks to the remarkably successful campaign against it in recent years, is no longer the scourge of early infancy that it was only a few decades ago. Nowadays, its toll of infant life in the first few months is far less than that exacted by the respiratory diseases.

For future progress in the reduction of infant mortality, special effort, next to prenatal care, should be devoted to the battle against the respiratory diseases, not only because of their direct threat to the new-born infant, but also for their prejudicial effect on the antepartal health of expectant mothers. Progress in this direction may well be expected through further developments in the field of chemotherapy.

One very fortunate circumstance in the present situation is the fact that the mortality from prenatal defects and the respiratory affections runs counter to the seasonal cycle of births; that in summer, when the birth rate is highest, the forces that tend to produce defective and nonviable offspring are the least active; and when these forces are at their maximum, they come at a season when fewer babies are exposed to them.

APPENDIX

The data on which the study presented in the text is based were abstracted from General Tables 1, 10, and 20 in the *Annual Reports of Births, Stillbirths and Infant Mortality in the United States for the years 1935 and 1936*, and from General Tables 1, 8, and 22 in the *Annual Reports of Vital Statistics for the United States, Part I—Place of Occurrence, for the years 1937 and 1938*. Since the Bureau of the Census changed the form of the infant mortality table in subsequent reports, it was impossible to continue the study for more recent years.

These tables give the monthly incidence of live births and stillbirths, and the deaths from important causes, in each month of the year among infants in certain age subdivisions of the first year of life. By counting back, from the month of death, the number of months corresponding to the age at death, it was possible to allocate the deaths of the infants to their month of birth, and hence to reconstruct infant mortality tables according to the month of birth. For example, babies dying in

September under 1 month of age were considered as having been born in September; those dying at 1 month and under 2 months were tabulated as being born in August; those who were 2 months old and less than 3 months were listed as being born in July, and so forth. Of course, this method is not strictly accurate since, for example, a child 25 days old (under 1 month) dying on the 10th day of September would have been born on the 16th of August and not in September as arbitrarily tabulated. A similar remark applies also to each other age at death. However, greater refinement in determining the month of birth was not possible since the Census Bureau tables did not give the exact age (i.e., in days) at death. In the following discussion mention of the month of birth must accordingly be taken as only closely approximate.

After the deaths had thus been classified on the basis of the month of birth, death rates at each month of age were computed in the following manner:

For children who died in the first month of life, the death rate was based on the number who were born in the same month. This seemed to be the best procedure because the great majority of babies who fail to survive the first month of life, die within the first week and so are born within the calendar month of their death.

For children of older ages, the procedure was changed slightly. As already pointed out, not all infants who died at age 1 month were born within the calendar month immediately preceding the calendar month of death. A substantial proportion were born in the second preceding month. Accordingly, the death rate of babies aged 1 month was based on the average of the births in the preceding month and in the second preceding month.

The steps in the computation from this point on are best illustrated by means of an example. Thus, consider the case for babies born in March. Since, in the months of March during the 3 year period, there were 18,680 deaths under 1 month of age and 563,547 live births, the mortality rate in the first month of life was 3,315 per 100,000 live births. This left, out of a cohort of 100,000 March babies starting from birth, 96,685 to enter into the second month of life.

Now, there were observed 2,264 deaths in the second month of life during the month of April, which contained 90 days for the 3 year period; the average daily deaths were thus $2{,}264 \div 90$. According to the assumption made, these deaths are to be related to an average of the births in February and March, numbering 541,007. In these 2 months, there were 178 days during the 3 year period (one was a leap year), or an average of 89 days per month. The average daily births then came to $541{,}007 \div 89$, and the deaths in the second month of life per 100,000 live births were

$$\frac{2{,}264}{90} \div \frac{541{,}007}{89} = 414 \text{ per } 100{,}000$$

Since 96,685 babies out of the cohort lived to enter the second month of life, the mortality rate (probability of death) in that month of age was

$$414 \div 96{,}685 = 428 \text{ per } 100{,}000$$

The number in the cohort left to enter the third month of life was $96{,}685 - 414 = 96{,}271$.

The records show that there were 1,600 deaths in the third month of life during May within the 3 year period, or an average daily rate of $1{,}600 \div 93$. In this way, it is found that the deaths in the third month of life per 100,000 live births were:

$$\frac{1{,}600}{93} \div \frac{541{,}007}{89} = 283 \text{ per } 100{,}000$$

The mortality rate (probability of

death) in the third month of age was, therefore, $283 \div 96{,}271 = 294$ per 100,000.

The procedure for computing death rates for the later months of life then continues along the same lines. The mortality rate for any specified cause at any month of life was computed by applying the ratio of deaths from that cause to all causes within the month of age to the corresponding mortality rate from all causes.

In the assignment of the month of birth to infants recorded according to month of death and age at death, the approximate method set forth above was employed, since the "attained age" is given in the Census reports only to the nearest month. It would be desirable for similar studies to be made with more exact assignment of the month of birth, if adequate data were obtainable.

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NOTE: The author is indebted to Mortimer Spiegelman for devising the foregoing procedure for the computation of the various death rates.* Grateful acknowledgment is also made of the interest and helpful advice of Dr. Alfred J. Lotka and Herbert H. Marks.

*A closely analogous method of computing mortality rates by age within the first year of life as used by the Registrar-General of England and Wales is described by Moriyama and Greville in *Vital Statistics—Special Reports*, Vol. 19, No. 21, p. 399, published by the United States Bureau of the Census, November 10, 1944.

Rheumatic Fever as a Reportable Disease

The latest edition of *The Control of Communicable Diseases,** says that "rheumatic fever is not communicable. The preceding streptococcal infection which precipitates rheumatic fever which is communicable has usually subsided at the time that rheumatic fever manifests itself." It says further, "Etiologic agent—unknown. Source of infection—unknown. Mode of transmission—unknown. Susceptibility and immunity—unknown."

This large unknown area gives point to the growing movement to include rheumatic fever among the reportable diseases. At the present time nine states—Arizona, California, Illinois, Iowa, Maryland, Michigan, Rhode Island, Utah, and Wyoming—and the District of Columbia require the reporting of rheumatic fever. Of the nine, only three are among those with the highest death rates from acute rheumatic fever—3 or more per 100,000 of 1940 population in the 2 year period 1939–1940. Even though a death rate is an imperfect measure for this condition, which is more often disabling than fatal, nevertheless the figures indicate that other states may see advantage in making the disease reportable.

* *The Control of Communicable Diseases.* 6th ed. American Public Health Association. 1945. 35c.

Nutrition and the Oral Tissues

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THE oral tissues are peculiarly sensitive to nutritional deficiencies and dietary aberrations. Clinically, the oral tissues are often the first to show the effects of such deficiencies, particularly if the deficiency is subclinical in nature. The oral tissues mirror the nutritional status of the body because of two unique characteristics:

1. The oral tissues range from the simplest (mucous membrane) to the most highly specialized tissue (the papillae of the tongue and the enamel and dentin). There are present, side by side, hard and soft tissues of both epithelial and connective-tissue origin. A highly varied range of responses and types of tissue reactions can therefore be seen at any one time. In addition, the oral tissues are constantly subjected to trauma and irritation by mechanical, thermal, and bacterial agents, and therefore are the first to exhibit the effects of systemic disturbances.

2. The oral cavity is an internal cavity of the body, dark and moist, and lined by a true mucous membrane continuous with the mucosa of the gastrointestinal tract. It receives the secretions of specialized glands and takes a major rôle in digestion. Yet of all the internal cavities of the body, it is the only one that is readily accessible and easily examined without the aid of highly specialized instruments.

When one has learned the simple alphabet of the oral tissues, he can read a clearly written answer to many of the mysteries of the state of nutrition of the body. The oral tissues have been called the barometer of the state of nutrition of the body.[1] They are even more than that. The enamel and dentin are kymographic, fixed records of the past history of the individual. The alveolar bone, the gingivae, and the tongue reflect the present internal status of the body as quickly as a thermometer reflects the temperature. The routine examination of the teeth, the gums, the tongue, the lips, and the saliva at periodic intervals is a simple and fairly accurate method of checking upon the nutritional status of both the child and the adult.

THE TEETH

The tissue affected by a given nutritional deficiency depends upon (a) the particular function of that nutritional element in the body economy, and (b) the specialized nature of the tissue and its ability to respond. For example, vitamin D is concerned with calcium metabolism, and therefore those tissues intimately concerned with calcium metabolism—the calcified tissues, bone and teeth—can be expected to respond early to a mild deficiency of vitamin D.

The type of response of a given tissue to a particular deficiency depends a good deal upon the stage of development of the organ or tissue examined. A young growing tissue responds quickly and almost violently to even minor changes in its food supply or internal environment, and the effect is often permanently recorded in its structure. An adult, slowly growing tissue, is affected to a much lesser degree, while an old, non-growing tissue cannot respond and is therefore unaffected by even severe deficiencies.

The Developing Teeth—During their

* Based on a paper presented at a Joint Session of the American School Health Association with the Food and Nutrition and the Dental Health Sections of the American Public Health Association at the Seventy-third Annual Meeting in New York, N. Y., October 4, 1944.

forming and calcifying period, the enamel and dentin are extremely susceptible to even minor variations in calcium metabolism (and vitamin D deficiencies).[2] The effects are recorded clearly and permanently within the structure of the enamel and dentin as hypocalcifications or, in severe cases, as hypoplasias.

The period of susceptibility to nutritional deficiencies begins with the development of the deciduous teeth at about 4 months in utero and lasts until the *crowns* of the permanent teeth (except the third molars) are completed at about the 6th year of life. The dentin of the roots rarely shows clinical abnormalities as a result of dietary deficiencies.

It would be a mistake to assume equal susceptibility of the dental issues to disturbances in calcium metabolism throughout their developmental period. Actually, the tissues formed during the prenatal period seldom if ever show any defects in calcification or formation because the developing fetus is a very well protected organism.[3] Even severe maternal deficiencies do not affect the teeth of the growing fetus.

On the other hand, the period from birth to about the end of the 1st year is a period during which the enamel, dentin, and bone show, in the vast majority of cases, severe disturbances in calcification. Very minor variations in nutrition and in health result not only in hypocalcifications, but often in enamel hypoplasias. In fact, 85 per cent of all enamel hypoplasias occur during the 1st year of life—often as a result of a relatively mild gastrointestinal upset, dietary incompatability, or nutritional deficiency.[3] The period from 2 to 6 years is a more resistant one and disturbances in enamel and dentin appear to a much lesser extent. After 6 years of age the recording period of the enamel is completed (except in the third molars).

The Adult Teeth—The erupted tooth is an adult organ and the enamel and dentin of the crown are non-growing tissues. They can therefore no longer be affected directly by any nutritional deficiency. Only local or topical factors can affect the tooth structure. These injuries are primarily bacterial or physical in origin (caries, erosion). The *adult* tooth reflects the environment in the oral cavity (quality of the saliva) and the physical character of the diet rather than nutritional indiscretions.[4]

The question of calcium withdrawal from the teeth is frequently raised because of a mistaken analogy between teeth and bone. The adult enamel has no vascular supply or cellular mechanism to make calcium withdrawal possible, as it is in bone.[5] The best proof of this fact is derived from the fact that rats subjected to parathyroidectomy and repeated pregnancies and lactations show severe bone changes and destruction but absolutely no effects upon the adult enamel and dentin.[6] In man, a similar experiment demonstrating the basic difference between bone and teeth has been observed in India. Women suffering from severe osteomalacia show no effects upon the enamel and dentin and in addition are relatively caries-free.[7]

THE ALVEOLAR BONE

In contrast to the teeth, the alveolar bone is an ever changing tissue, constantly being built up, torn down, and rebuilt. Like the teeth, however, it is an excellent index to and reflects clearly disturbances in calcium metabolism. Since the use of dental x-rays is as routine to the dentist as the thermometer is to the physician, careful examination of the alveolar bone can do much toward the early detection of nutritional deficiencies—even in the adult. The need for just such criteria of assessment for calcium needs in the adult has been very well shown by Youmans.[8]

THE GUMS AND GINGIVAE

The earliest sign of a frank or subclinical vitamin C deficiency is often a painful marginal gingivitis with bleeding upon the slightest trauma. However, this gingivitis must be clearly distinguished from a purely local gingivitis by careful analysis and prophylaxis.[9]

A "normal" level of ascorbic acid in the blood is not sufficient evidence, in itself, to exclude a deficiency in the tissues. In addition, there are many instances in which a deficiency may be apparent only in a single tissue. Such a localized tissue reaction indicates that the deficiency is only a relative one, i.e., *minimal* amounts of a given food element are present so that, while no frank and typical deficiency state exists, a particular tissue using large amounts of that element may suffer from an actual deficiency when subjected to stress. Vitamin C is essential to rapid wound healing.[10] Thus the constantly traumatized and irritated gingivae may be the only sign of a latent or subclinical vitamin C deficiency.[11]

There are also many instances of endogenous deficiencies in which symptoms of a nutritional deficiency exist in spite of an adequate intake. Sometimes a defect in the absorptive mechanism can be discovered (achlorhydria, celiac disease) and sometimes a defect in transportation or storage occurs (liver damage, rat vs. guinea-pig). More recently we have begun to realize that endogenous deficiencies may occur as a result of the failure of the tissues to utilize the food elements, all other factors being normal.[12]

Thus we are becoming more and more aware of the necessity for examining specific tissues for clinical signs of nutritional deficiencies rather than depending only upon the laboratory analysis of a blood sample. The work of Kruse[11] and others using the capillary microscope and the slit lamp indicates that the examination of the gingivae may offer a valuable means of clinically assessing the utilization of vitamin C by the tissues—and therefore the detection of subclinical and endogenous deficiency states.

THE TONGUE AND LIPS

The specialized epithelium on the dorsum of the tongue is susceptible to even mild deficiencies of the vitamin B complex, particularly riboflavin and niacin. The capillary network supplying the fungiform and filiform papillae is so affected as to produce a characteristic glossitis. While the exact mechanism involved is still somewhat obscure, the clinical stages have been clearly described and are readily recognized.[13, 14]

Riboflavin deficiency results in a magenta-colored, pebbly tongue from which the filiform papillae are desquamated and the fungiform papillae engorged.[15, 16] A concomitant cheilosis, or maceration and fissuring of the angles of the mouth, usually occurs, as well as a vascularization of the sclera of the eye.[17] The glossitis and cheilosis must be distinguished from the atrophic glossitis and pseudo-cheilosis found in edentulous persons or in those with poorly fitting artificial dentures.[18]

Niacin deficiency results in a characteristic fiery-red, atrophic, burning glossitis.[19] Both the filiform and fungiform papillae are atrophied. The tongue may be swollen in the early stages and shrunken later. The entire oral mucosa as well as the gingivae often becomes reddened and ulcerated. These ulcers present a grayish exudate which yields rich cultures of Vincent's organisms. This type of infection subsides after adequate niacin therapy.[20]

A measurable proportion of the patients in the older age groups who complain of abnormal oral sensations (glossodynia and abnormal taste sensations) respond favorably to vitamin B complex therapy.

SALIVA

Water is not often considered a dietary factor since it is so plentiful. However, a deficiency in water intake or an aberration in water metabolism can certainly have serious consequences. The oral tissues are normally bathed in a watery medium and are quickly affected by a reduction in the flow of saliva. A decrease in the *quantity* of saliva such as occurs in all dehydration states and fevers soon results in a coating of the tongue. The dry, coated tongue is an excellent clinical index to the state of dehydration of the body.[13, 14]

The significance of changes in the *quality* of the saliva merits further investigation and will certainly do much to clarify the relation between systemic factors and dental decay.

ORAL HYGIENE

The physical character of the food is not a nutritional factor but it is an important dietary consideration. The natural cleansing action of the food is an important adjunct to good oral hygiene. The detergent action of the food must supplement the toothbrush in preventing the accumulation of food debris, with subsequent caries and local gingivitis.[21, 22] Since relatively few individuals use the toothbrush correctly or effectively, the physical character of the food is an important consideration in planning a well balanced diet.

CONCLUSION

Routine examination of the oral tissues offers a relatively simple and fairly accurate index to the state of nutrition of the individual.

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Physical Growth in Childhood and Military Fitness*

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THIS report summarizes certain data on the Selective Service status of a sample of men whose stature and weight were measured a number of years ago when the men attended grade or high school. The purpose of the present analysis is simply to learn whether men who have been disqualified for military service differed in childhood physical growth from men who have been accepted.

The information that can be thus acquired is pertinent to the solution of one of the important problems connected with school health work. That problem concerns the value of observations on physical growth and their interpretation with reference to health and disease. Although it has now become a widespread practice in schools to measure the physical growth of children, and stature and weight are the two physical characteristics generally measured, there is evidence of confused thinking as to the significance of variations in growth patterns. The confusion is due undoubtedly to the inherent complexity of the growth processes and of the many factors which influence them. Lacking the basis for a correct interpretation of the results of measurements, there arises the tendency either to disregard them or to overemphasize the importance of some one factor, for example, nutrition or diseased tonsils, on the results. It is well appreciated that adequate quantitative data are required for a solution of this problem, and that such data must be obtained by continued and periodic observations of the same individuals and by extending the observations beyond childhood. The study of which this is a preliminary report was undertaken in the light of these considerations.

MATERIAL AND METHOD

The records of stature and weight are those collected at Hagerstown, Md., during the school years 1923–1927 and since 1933 by the U. S. Public Health Service. All the measurements were taken in the month of May, and the age at the time of observation is the age at last birthday calculated as of May 1 of the year of measurement. Only records for white children have been used. The measuring technique has been described in detail elsewhere.[1, 2]

The steps in selecting the sample here studied were the following:

1. From the Hagerstown files were extracted the records of all boys born between 1910 and 1925.

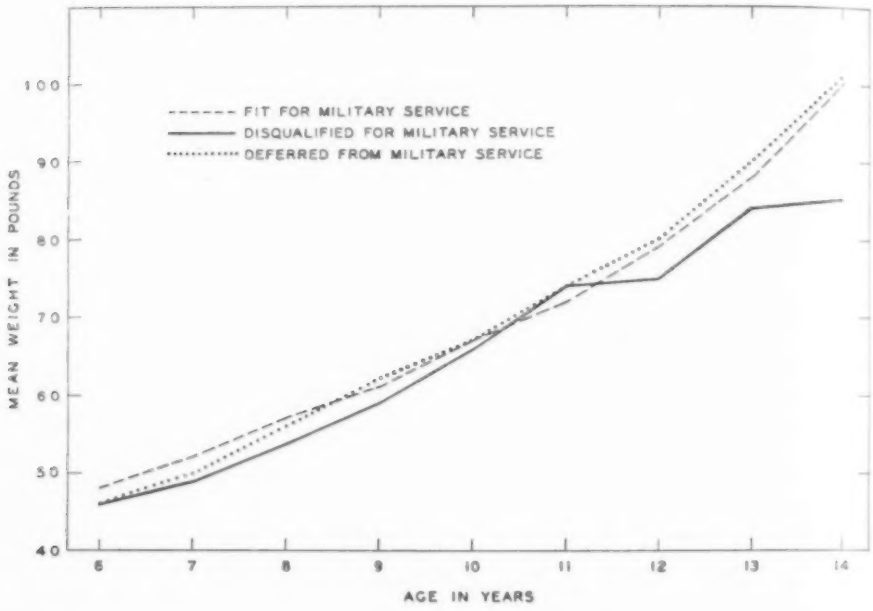
2. These records were matched with the list of registrants of one of the two Selective Service Boards of Washington County.

3. Through the kind coöperation of the officials of that Selective Service Board, information was obtained about the classification of the registrants as of September 1, 1943, the date when this study was initiated.

* Based on paper presented at a Joint Session of the School Health and Vital Statistics Sections of the American Public Health Association at the Seventy-third Annual Meeting in New York, N. Y., October 4, 1944.

FIGURE 1.

BOYS MEASURED IN 1923–27 ACCORDING TO SELECTIVE SERVICE STATUS SEPTEMBER, 1943



All together records were found for 12,634 annual weight measurements on boys born between 1910 and 1925, and 5,122 records of annual stature measurements. Measurements of stature were not taken before 1935, hence the smaller number of these records.

Of the above annual measurements 6,061 records of weight and 2,596 records of stature concerned boys who were not registered at the specific Selective Service Board. In this group are included boys who died or moved from Hagerstown after the measurements were taken, or are registered at the other board.

There were found weight and stature measurements on 1,631 Selective Service registrants. On the basis of the Selective Service classification of the date stated the registrants have been grouped in the following three categories:

1. *Physically fit*—Men already serving in the armed services and men not yet inducted on September 1, 1943, but classified in 1-A, accepted for general military service, or in 1-A(L), accepted for limited service
2. *Disqualified*—Men classified in 4-F
3. *Deferred*—Men in other classifications

The school records for the 1,631 Selective Service registrants consist of: 4,126 annual weight and 2,001 annual stature measurements on the physically fit; 1,000 weight and 363 stature measurements on the disqualified; and 1,447 measurements of weight and 162 of stature on the deferred.

It is a well known fact that for some time there has been an upward trend in the weight and stature of children. Since this trend might affect the comparability of the above three groups, the data of all the annual measurements have not been combined but are considered separately for the following three periods: 1923–1927, 1933–1937, and 1938 and later.

WEIGHT IN SCHOOL AND SELECTIVE SERVICE CLASSIFICATIONS

The weight measurements taken when the three groups of Selective Service registrants attended grade or high school are shown in Figures 1 to 3 for the three periods indicated.

Considering the measurements taken in 1923–1927 (cf. Figure 1), that is, about twenty years before the Selective Service examination, one notes that at each age except 11 years the boys who later were disqualified for military service were lighter on the average than the boys who passed the physical examinations. Disregarding the boys measured at 11 years of age, the average differences between fit and disqualified boys vary from 0.9 lbs. at 10 years of age to 3.9 lbs. at 12 years.

A similar comparison for measurements taken in 1933–1937, and 1938 and later, reveals differences in the same direction but they are more marked. In these two series, at every age the boys who were eventually found fit for military training were heavier than the boys who eventually did not qualify.

When the three series of measurements are combined as shown in Table 1, the differences between the boys who were later accepted and those who were disqualified for military service are just as striking. The data of Table 1 indicate that the former weighed about 2 lbs. more than the latter when the measurements took place at 11 years of age or earlier; and from 5 to 11 lbs. more when the measurements were taken at 12 years of age and later.

The differences between the two groups of registrants of the same age are not always statistically significant but the consistency in the direction of the differences warrants the conclusion that the boys who were later to be disqualified for military service were as a group lighter in weight than the boys who eventually qualified for military service. This is true even of those measured as long ago as twenty years before their Selective Service examination.

Data are also presented regarding the weight in childhood of the men deferred and those not now registered at the specific Selective Service board in Hagerstown. The former reveal that the average weight of these boys in general is somewhat less than although close to the averages of the boys who were found fit in adult years. This is to be expected. In the first place, the deferred group may be biased by the

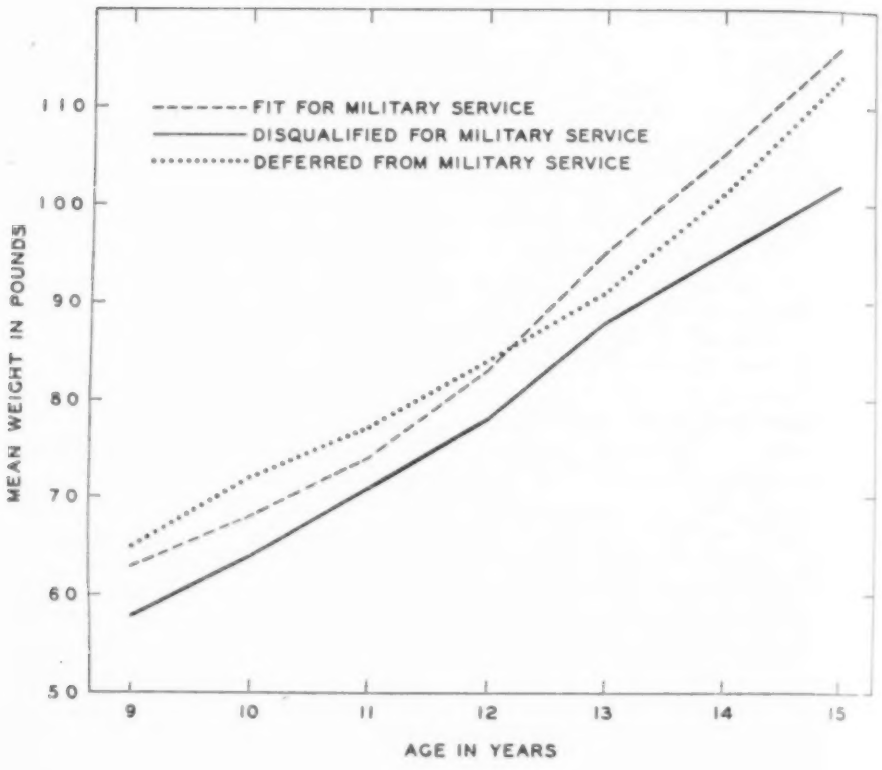
TABLE 1

Mean Weight (in Pounds) of Hagerstown White Males, Classified by Age at Time of School Examination and Selective Service Status on September 1, 1943

Age at measurement	Selective Service status, September 1, 1943											
	Physically Fit			Disqualified			Deferred			Not registered at Selective Service Board		
		Weight			Weight			Weight			Weight	
	No. of boys	Mean	Standard deviation	No. of boys	Mean	Standard deviation	No. of boys	Mean	Standard deviation	No. of boys	Mean	Standard deviation
6	49	48.0	6.4	22	45.8	4.1	39	45.4	5.3	142	47.2	6.1
7	146	51.7	7.0	54	48.8	5.4	85	50.2	6.0	403	50.4	6.2
8	289	56.7	8.6	88	54.0	7.8	144	56.3	7.6	525	55.8	7.5
9	340	62.2	9.5	96	58.9	8.2	199	62.4	9.8	572	60.6	8.4
10	386	67.8	10.9	93	65.3	10.9	201	67.8	12.2	603	67.7	9.4
11	464	74.0	10.1	99	72.2	13.2	179	74.6	13.2	625	74.0	12.6
12	460	82.4	12.7	103	77.1	16.7	195	81.3	13.6	645	82.1	14.9
13	495	94.4	18.6	114	87.6	20.5	152	91.0	17.7	668	93.4	18.3
14	490	108.1	21.0	108	97.4	23.4	118	103.4	19.1	604	106.8	22.2
15	375	120.4	21.1	93	109.8	24.0	58	111.9	24.8	476	118.9	21.0
16	267	133.4	24.3	56	122.4	23.9	37	133.9	14.7	358	130.3	24.1
17	220	141.1	22.3	37	133.4	23.9	23	140.7	6.0	288	139.1	24.6
18	111	145.8	25.7	22	138.1	21.2	11	134.5	15.8	109	144.1	21.5

FIGURE 2

BOYS MEASURED IN 1933–37 ACCORDING TO SELECTIVE SERVICE STATUS SEPTEMBER, 1943



tendency on the part of boys with accelerated growth to marry earlier and have a family. Secondly, the disqualified would constitute only a minority in any group of men. As for the boys not registered in the Hagerstown board, they constitute in effect a control group and, as would be expected, the mean weights of this group fall between the mean weights of the fit and the disqualified at nearly every age.

DEVIATION FROM AVERAGE WEIGHT IN CHILDHOOD AND FREQUENCY OF DISQUALIFICATION

The significance of the above findings are perhaps better appreciated when one examines the percentage of boys who were disqualified among those who deviated by a specified amount from the average weight for their age. Data on this point are summarized in Table 2. The deviation from the average weight is here expressed in terms of the standard deviation or sigma. The average weight for each age is the mean of the weights of the physically fit plus the disqualified.

The data shown in Table 2 reveal principally that:

1. The percentage of disqualifications is highest among boys whose weight was less than the average by more than 1 sigma. Only for two extreme age groups with few observa-

TABLE 2

Percentage Disqualified by Selective Service, Classified by Age at Time of School Examination and by Deviation from Mean Weight of Age Group

Age at measurement	Deviation from mean weight (in units of the standard deviation)				
	-1σ or greater	$-\frac{1}{2}\sigma$ to -1σ	$-\frac{1}{2}\sigma$ to $+\frac{1}{2}\sigma$	$+\frac{1}{2}\sigma$ to $+1\sigma$	$+1\sigma$ or greater
6	38	50	27	38	10
7	42	37	21	27	9
8	41	20	22	20	18
9	38	21	22	13	16
10	36	15	18	24	13
11	28	17	14	12	21
12	35	14	12	19	17
13	32	24	14	10	19
14	37	25	12	12	12
15	37	25	15	15	14
16	34	22	13	22	8
17	20	15	14	6	16
18	24	28	9	19	8

tions is this not found. In general, among the boys whose weight was less than the average by 1 sigma or greater over 30 per cent were later disqualified. This percentage, in general, is over 1½ times the rate of disqualification found for all boys.

2. There appears to be a tendency, though not a very consistent one, toward a decrease in the rate of disqualification with increase in weight. In 7 of the age groups studied, the percentage of rejections is lowest for the boys whose childhood weight was above average by 1 sigma or greater.

3. The percentages of disqualifications relative to deviation from average weight do not increase or decrease regularly with increasing age.

These findings all point to an association between growth in childhood and development of physical defects leading to disqualification for military service. It can also be inferred that underweight more than overweight is associated with the development of these defects, and that the more marked the degree of underweight the greater are the chances of manifesting those defects.

STATURE IN CHILDHOOD AND SELECTIVE SERVICE CLASSIFICATION

In Table 3 data are presented on stature of boys measured since 1933. From this table it appears that for each age, with but one exception, the boys who later were found fit for military service were taller than the boys who were disqualified. The differences are in general small, being less than 5 cm. in most instances and not statistically significant in the majority of age groups.

TABLE 3

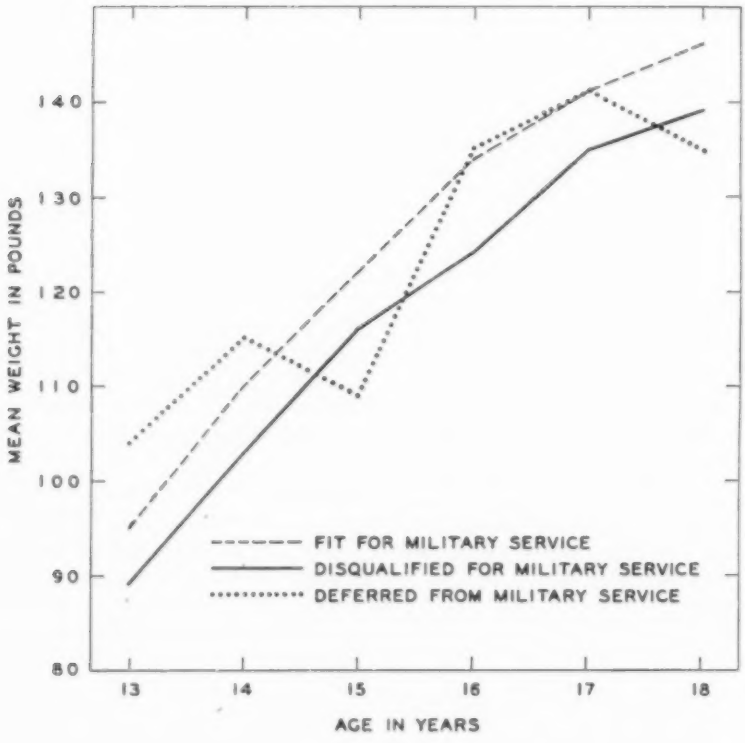
Mean Stature (in Centimeters) of Hagerstown White Males, Classified by Age at Time of School Examination and Selective Service Status on September 1, 1943

Age at measurement	Selective Service status, September 1, 1943									Not registered at Selective Service Board		
	Physically Fit			Disqualified			Deferred					
	No. of boys	Stature		No. of boys	Stature		No. of boys	Stature		No. of boys	Stature	
		Mean	Standard deviation		Mean	Standard deviation		Mean	Standard deviation		Mean	Standard deviation
9	16	134.3	5.6	*	....	...	*	....	...	76	130.8	5.8
10	84	137.1	6.6	13	132.2	6.4	*	....	...	34	134.4	6.3
11	82	142.2	6.9	11	142.4	6.2	*	....	...	201	141.1	6.5
12	209	147.1	7.5	35	142.2	8.1	16	149.7	6.7	296	147.0	6.9
13	303	153.4	8.2	57	151.4	9.2	27	154.4	8.5	379	152.6	8.4
14	352	160.0	9.0	69	156.8	9.6	23	162.4	8.2	439	159.4	9.1
15	319	166.3	8.4	67	162.4	8.7	17	164.9	7.7	404	164.4	8.2
16	272	170.1	7.0	40	166.5	9.8	27	171.1	5.6	333	168.8	8.1
17	219	172.8	6.8	35	171.7	7.8	23	173.7	5.8	282	171.6	7.9
18	111	173.7	6.5	20	171.2	6.9	11	169.9	4.9	109	171.9	3.8

* Less than 10 boys measured

FIGURE 3.

BOYS MEASURED SINCE 1938 ACCORDING TO SELECTIVE SERVICE STATUS SEPTEMBER, 1943



However, the consistency in the direction of the difference makes it appear that the disqualified men as children were already differentiated in growth of stature from the children who were to be found fit for military service.

DISCUSSION

The data reveal that in general at each age boys who were later disqualified for military service were on the average lighter and shorter than the boys who were found qualified. The findings are the same whether one compares the boys measured twenty years or only one or two years before being examined for military service, although the differences are larger for the more recent periods. Since the final size reached by the boys is not known, it is not certain if the observed differences in stature and weight indicate only delay in growth or a smaller adult size. The findings on the boys of age 18 would favor the latter conclusion.

In considering the findings it should be borne in mind that disqualifications for underweight constitute only a small percentage of the rejections, and it can therefore be presumed that the number of such rejections is not sufficient to produce the observed lower weight of the group of disqualified in this sample. If this presumption is tenable then it must be inferred that retarded growth is associated with the other pathological proc-

esses which eventually led to the disqualification of the men for military service. This inference finds support in the results of a survey [3] which found that children with defects (carious teeth, diseased tonsils and adenoids, defective vision, enlarged cervical and submaxillary glands) were smaller than children without such defects. The conclusion would seem warranted that the measurement of growth has a definite value as an index of physical status in general and can be effectively employed as one method of "screening" children with physical defects. With reference to this point, it is found also that the percentage of disqualifications was highest among boys who deviated the most in the direction of underweight from average weight of their age group.

The simplicity with which accurate measurements can be taken and the ease with which records can be made and kept for comparisons over long periods of time are other factors pertinent to the use of growth measurements in school health work.

It should be emphasized that although the evidence indicates that growth status is valuable as an index of physical state, retarded growth is not always a sign of disease. Instead, the observations on growth status should be regarded as are all physical signs elicited on examination of an individual, and the growth status of the individual should be integrated with all other physical data before arriving at a definitive diagnosis.

The criterion employed to evaluate the adult physical status of the boys measured is determined by standards established for military personnel. It is clear that a man disqualified for military service on physical grounds is not necessarily ill or incapacitated for useful civilian work. However, the findings of this study are not invalidated nor do they acquire less importance because the disqualifying defects are not fully disabling or fatal. The disqualified men have certain defects and a positive association has been found between the development of these defects and retarded growth in childhood.

The above findings, taken together with similar observations [4] that certain disqualifying defects were already evident in childhood, emphasize the importance of child hygiene work for the health and welfare of the population. There can be no doubt that the health of the child will be reflected in that of the adult, and that all efforts which increase the physical well-being of children will result in healthier adults. However, the possibility of seeking and correcting in childhood the roots of many adult diseases has not been sufficiently appreciated in the past. School health programs have been initiated without a clear conception or definition of this main goal and consequently they do not receive the required support from parents, school and health authorities. The results of this study should provide a further stimulus to the appraisal of school health programs in relation to what they aim to do and actually accomplish for the health of children.

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Memphis and Shelby County Tuberculosis Control Program*

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IN July, 1941, a Division of Tuberculosis Control was organized in the Memphis and Shelby County Health Department, in an effort to intensify the program against tuberculosis. This paper will present the administrative organization of the division together with several statistical tables illustrating its activities to date. One of the primary objectives of the new plan was to correlate the work of various official and voluntary organizations which were working wholeheartedly in the field of tuberculosis control, but were often at cross purposes with each other. For instance, the local tuberculosis society had at that time a group of visiting nurses who did field work in competition with the regular district nurses of the health department. There was also only somewhat perfunctory coöperation between the tuberculosis sanatorium and the health department, so that neither organization could complement the work of the other.

In order for the coördination to be most effective, a unique administrative plan was adopted. Several members of the staff of the tuberculosis division serve in a liaison capacity with other groups. The nursing supervisor directs a group of generalized staff nurses, and serves also as consultant on matters pertaining to tuberculosis nursing throughout the health department. The x-ray technicians serve both the tuberculosis sanatorium and the field program, and the director of the tuberculosis division is a regular member of the staff of the sanatorium.

Since this plan has been in operation, excellent coöperation has existed among all the organizations concerned in tuberculosis work. The Shelby County Tuberculosis Society no longer conducts a field program. It contributes money to the Health Department which is used to pay a clerk and a nurse in the tuberculosis division, and it is also liberal in donations for special equipment. Its program is now almost entirely limited to educational activities and social service, and its work is planned in consultation with the Health Department. All field nursing is done by the Health Department staff. No organization in the county is engaged in any tuberculosis program without the full knowledge of the Health Department.

A definite division of responsibility was made between the sanatorium and the Health Department, with the latter assuming full responsibility for all indigent patients before their admission to the sanatorium, and after their discharge, including follow-up examinations, nursing visits, and treatment. It is impossible to confine all infectious tuberculous individuals in institutions throughout their contagious period. Therefore, tuberculosis control will remain principally a field problem, even after adequate hospital beds are

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available. The function of the hospital is to prepare the patients to return to the field.

With the sanatorium and Health Department so intimately connected, the patients are under continuous observation from the time of first diagnosis through the period of hospitalization, and until the termination of the case, either by death, removal, or recovery. This provides a continuity in management of each case, which is both beneficial and reassuring to the patients.

Since we are responsible for all tuberculosis work that goes on outside the sanatorium, our program is twofold, first, case finding, and second, case follow-up. These will be discussed in some detail. For convenience in presentation, the follow-up phase will be described first.

No patient is discharged from the sanatorium without the consent of the director of the tuberculosis control division. All patients are interviewed by him before they leave the sanatorium, and their home management is planned at that time. A patient whose economic station permits is referred to the physician of his choice for further care, and a summary of his treatment is sent to the physician. At least once a year thereafter, a public health nurse is asked to visit the patient and to report whether or not he has remained under treatment. Other than that, our services are given to these patients only when requested by the attending physician. The indigent patients are referred to a tuberculosis division clinic for further observation. Pneumothorax refill stations have been set up in five district health centers in the city and county, and clinic sessions are held in the different places at varying times to meet the convenience of all the patients. The fluoroscopes, instrument cabinets, and other equipment at these refill stations were furnished by the Shelby County Tuberculosis Society and were purchased out of Seal Sale funds.

We are now caring for approximately 100 pneumothorax patients and giving about 350 refills monthly. In three years of this work there has not been a serious accident. Two emergency admissions to the sanatorium have been necessary, one as a result of traumatic collapse in a bilateral case, who was discharged after four days' rest. The other was for intrapleural hemorrhage, presumably from rupture of an adhesion, which occurred several days after a refill. This patient made an uneventful recovery also, but his pneumothorax was discontinued. This rather low incidence of complications we attribute to the excellent condition in which these patients are sent to us from the sanatorium. There is no time limit on occupancy at the sanatorium, and patients are kept until their lesions are stable enough to be good risks for outpatient treatment. No pneumothoraces are induced in the clinics. We consider this to be a hospital procedure. The complications which would accompany the induction of pneumothorax in the clinics are apt to result in numerous emergency admissions to the sanatorium. This would tend to increase the crowding in the sanatorium and would also lessen the confidence of other patients in the procedure.

There is a constant interchange of patients between our clinics and the physicians in town who administer pneumothorax therapy. Frequently the same patient is exchanged several times depending on his varying economic status. The practitioners in our community who are engaged in pneumothorax work have a liberal interpretation of medical indigency. No patients are required to make burdensome sacrifices in order to obtain necessary treatment.

Patients who are discharged from the hospital without pneumothorax are examined in the clinics as often as indi-

cated. Instructions for the patient are given at the interview which follows completion of the examination, and the public health nurse in his district is given a written record of the instructions, together with a recommendation for future visits. This procedure is also followed for patients who are discovered while their disease is inactive, and who are held under observation in the clinics.

The case finding program is based on a rather extensive x-ray service. The division operates an ambulatory unit which is equipped to make stereo 4 x 5 in. photofluorographic films and standard 14 x 17 in. chest films. The x-ray equipment was furnished by the Shelby County Tuberculosis Society. The Mobile Unit requires 220 volts for operation, and special receptacles have been provided at strategic locations in the city and county. Clinics are held twice a day, five days a week. A clinic schedule is drawn three months in advance and the various stops are visited as the population density warrants. This mobile unit was placed in operation in May, 1942, and has proved quite satisfactory.

A plan of operation of the case finding services was approved by the local medical society before its adoption, and has worked without friction. Patients are accepted without regard to financial status. Some are referred by their physicians, and others by the public health nurses. Still others come voluntarily for examination because of suspicious symptoms or family history of disease. The films are read and reported within one week. Written reports on referred patients are mailed to their physicians, and oral reports are given to the other patients at the clinic. Since the beginning of the program 19,709 films have been made on patients who had not been previously diagnosed as tuberculous. This included 17,547 first examinations and 2,162 recheck examinations of previously negative patients. The x-ray examinations are tabulated by a punch card system and the results are periodically analyzed and studied. This enables us to identify the more productive groups and to modify our emphasis accordingly.

We have prepared several tables illustrating the findings in our x-ray examinations.

TABLE 1

X-ray Results by Age Groups

Age Groups	*Number X-rayed*	*Number Positive*	*Per cent Positive*
0– 15	4,756	91	1.9
16– 35	10,839	597	5.5
36– 55	3,404	394	11.6
56–100	710	142	20.0
Total	19,709	1,224	6.2

Table 1 shows the number of persons examined and the number found positive by age groups. We have chosen these rather large age groups because they are significant in regard to treatment and progress. The number of cases found in the group under 15 years is, as expected, very small. Purely as a case finding operation this would be unprofitable, but we have found it advisable to include all the family in examining groups of contacts. The larger percentage of positive cases in the 36 to 55 age group points to this as a group which should be more intensely surveyed. We expect that fairly large percentages of this age group will be included in our industrial work. Above 56 years the percentage of positive x-rays is large, but the number of individuals concerned is rather small.

We do not know just how productive a case finding service should be, but our figure of 6.2 per cent appears reasonably satisfactory. Too high a figure would indicate that selection of patients is too rigid, and that numerous asymptomatic cases are being overlooked, while too low a percentage would not be feasible from an economic standpoint.

TABLE 2

Comparative Results by Age Groups

Age Groups	Per cent of X-rays	Per cent of Cases
0- 15	24.1	7.4
16- 35	55.0	48.6
36- 55	17.3	32.4
56-100	3.6	11.6
Total	100.0	100.0

In Table 2 we have charted the percentage of the x-rays by age group against the percentage of the total number of cases found. It is noted that in the group under 15 years, 24 per cent of our time was spent to find only 7 per cent of our cases. This chart again emphasizes that it is more profitable to examine individuals in the upper age group than children.

TABLE 3

X-ray Results by Sex and Color

Color and Sex	Number X-rayed	Number Positive	Per cent Positive
White Male	5,436	301	5.5
White Female	6,117	362	5.9
Colored Male	2,825	258	9.1
Colored Female	5,331	303	5.7
Total	19,709	1,224	6.2

In Table 3 the x-ray results are tabulated according to the sex and color of the individuals examined. It is rather surprising that the percentage of positive cases in the colored females is approximately the same as that in the whites. The colored male percentage is considerably higher, but the number examined is lower than any other of the four groups.

In 1943, the death rate for Negroes in the community was 115 per 100,000, while the white death rate was 37.5. It is apparent that our case finding is deficient in the colored race. We are probably examining a selected healthy group of Negroes. Over a long period of years it has been observed in Memphis that the Negro response to a generalized health program is better than the white. This does not hold true for the tuberculosis program. Equal opportunities for examinations are arranged for Negroes and whites. The Negro will come for x-ray examination if he does not suspect that he is ill. If he has symptoms of tuberculosis he will postpone the examination until the last possible moment and will usually be found to have far advanced and bilateral disease. This attitude is probably due to the deep-seated belief among Negroes that there is no hope for recovery once a diagnosis of tuberculosis has been made. We hope that a few good results from treatment of early cases in Negroes will change this attitude. Educational work among the Negroes is especially needed. This is a field in which the school health program and the voluntary health agencies can take a leading part.

TABLE 4

Comparative Results by Sex and Color

Sex and Color	Per cent X-rayed	Per cent Positive
White Male	27.6	24.6
White Female	31.0	29.6
Colored Male	14.3	21.1
Colored Female	27.1	24.7
Total	100.0	100.0

Table 4 illustrates again the comparative results by percentage according to sex and color. It shows very clearly that the colored males constitute the most fertile field for future activity. An industrial survey program is being planned which will reach large numbers of Negro males at their work. This should correct this deficiency in the program.

In Table 5, the 1,224 cases of pulmonary tuberculosis have been divided by color into stages. Of all cases, 51.9 per cent were thought to be active when discovered. In the white patients only 23.8 per cent were classified as far advanced and 36.4 per cent were minimal. In colored active cases 51.5 per cent were found far advanced and

TABLE 5

Stage and Activity by Color

	Active—51.9 Per cent				*Inactive—48.1 Per cent*			
	White		*Colored*		*White*		*Colored*	
	No.	*Per cent*	*No.*	*Per cent*	*No.*	*Per cent*	*No.*	*Per cent*
Minimal	100	36.4	80	22.4	241	62.3	139	69.2
Moderately Advanced	110	39.8	94	26.1	90	23.2	40	19.9
Far Advanced	66	23.8	186	51.5	56	14.5	22	10.9
Total	276	100.0	360	100.0	387	100.0	201	100.0

only 22 per cent minimal. In the inactive group 62.3 per cent of the whites were classified as minimal.

We have made an effort not to overread these films and have limited our diagnoses to those persons in whom sufficient x-ray evidence is present to warrant further observation. Small linear fibrotic areas and increases in lung markings are usually noted in the interpretation of the film, but are not considered diagnostic.

There has been only one instance in which a definite lesion is known to have been missed. This was a contact who was examined and reported negative. On reëxamination 3 months later, a moderately advanced lesion was present. When his original film was reviewed, a minimal lesion could be seen and should have been diagnosed.

TABLE 6

X-ray Results by Sources

Source	*Number X-rayed*	*Number Positive*	*Per cent Positive*
Contacts	5,895	409	7.0
Suspects	6,601	603	9.1
High School Students	2,936	4	0.1
Med. Students and Nurses	729	2	0.3
Prenatals	1,022	21	2.1
Penal Farm and Isolation Hosp.	1,052	35	3.3
Miscellaneous	1,474	150	10.0
Total	19,709	1,224	6.2

The x-ray results are tabulated by classification of patients. Contacts are defined as persons who have been in more than casual association with a known case of tuberculosis. This includes active and inactive cases, and also includes household contacts and visiting contacts. Persons who are sent by their physicians are listed as suspects unless a definite diagnosis has been made, in which case they are not included in the case finding figures. People who voluntarily come to the clinic and those sent by the public health nurse because of symptoms suspicious for tuberculosis are also classified as suspects.

The high school students were members of the 11th and 12th grades. They were examined as part of an intensive health program put on in that group by the Health Department. The medical students and nurses attended the University of Tennessee School of Medicine and were examined every 9 months throughout their course of study. The prenatal patients were in attendance at the Health Department Prenatal Clinics. The Penal Farm group consists of short-term convicts at the county farm, and they are grouped with girls who were sent to the West Tennessee Isolation Hospital for venereal disease. The miscellaneous group includes draftees who were rejected at the induction stations, the Health Department personnel who are x-rayed yearly, and several small groups of workers who were examined before our industrial program was started.

It will be noted that the contacts were 7 per cent positive. This is considerably lower than has been reported in studies by the Tennessee State

Health Department, but they were concerned with contacts to sputum-positive cases only. The suspects are 9 per cent positive. All of this group have symptoms which are suspicious for tuberculosis and one would expect a higher percentage of positive cases. The 10 per cent in the miscellaneous group is a reflection of the rejected draftees, many of whom were previously diagnosed.

The high school students are no longer x-rayed routinely. We have substituted a small-scale industrial program, devoting one day each week to the survey of employees of war plants. This work is expected to increase the number of colored males and of older individuals.

The percentage of positive medical students and nurses is unexpectedly low and we make no attempt to explain this.

We think that the prenatal group is worthy of continued examination even though the yield is small, since these women in the productive age of life always have large groups of contacts.

The Penal Farm and Isolation Hospital individuals are a group which is greatly refractory and whose examination would be unlikely on a voluntary basis. We expected a higher incidence of tuberculosis in these people and again we make no attempt to explain the small number found.

We have recently required x-ray examination of applicants for health cards. These cards are used principally by domestic servants, and are required by the housewives before the servants are employed. We will gradually cover a large proportion of the Negro females in the community by this program.

TABLE 7

Comparative Results by Sources

Source	*Per cent of X-rays*	*Per cent of Cases*
Contacts	29.9	33.4
Suspects	33.5	49.3
High School Students	14.9	0.3
Med. Students and Nurses	3.7	0.2
Prenatals	5.2	1.7
Penal Farm and Isolation Hosp.	5.3	2.9
Miscellaneous	7.5	12.2
Total	100.0	100.0

Table 7 is an evaluation of the cases found for the time spent in various groups. The suspects do not include any persons with known contact to tuberculosis. Despite this, almost half the cases were found among suspects.

In Table 8 the 636 active cases are tabulated according to the stage of the disease and the classification of patients. Among the contacts 38.4 per cent were minimal and only 27.4 per cent far advanced. Among the suspects, over half were far advanced and only 17.8 per cent were minimal. This indicates that people who are sick will postpone examination of the chest until a large majority of them are far advanced. Among the other group of individuals the cases found were so small as to be insignificant if taken separately. They were, therefore, lumped together and the stages run comparable to those found in the contacts.

The year 1943 was the first complete year of full-scale operation of the program, and the cost for that year was

TABLE 8

Stage of Active Cases by Sources

	Contacts		*Suspects*		*Other*		*Total*	
	No.	*Per cent*	*No.*	*Per cent*	*No.*	*Per cent*	*No.*	*Per cent*
Minimal	84	38.4	56	17.8	40	39.2	180	28.3
Moderately Advanced	75	34.2	86	27.3	43	42.1	204	32.1
Far Advanced	60	27.4	173	54.9	19	18.7	252	39.6
Total	219	100.0	315	100.0	102	100.0	636	100.0

$12,234.13 including salaries, allowances, material, supplies, and depreciation on equipment. No attempt was made to allocate this expense to the component parts of the program, but it was all figured on a cost per film, and cost per case basis. This amounts to $1.50 for each x-ray examination, and $39.72 for each new active case found. The total cost of the tuberculosis program was 2.48 per cent of the Health Department budget for 1943.

SUMMARY

The organization of the Division of Tuberculosis Control in the Memphis and Shelby County Department of Public Health has been presented in detail together with statistical tables illustrating its operation and results to date. The salient features of this plan are:

1. The community-wide organization and prestige of the Health Department are utilized for work in tuberculosis control.
2. All work in the field of tuberculosis is coördinated through a single administrative office.
3. Coöperation with voluntary agencies as practised is mutually beneficial and prevents duplication of effort.
4. The field program assumes responsibility for management of the indigent patients at all times except during their period of hospitalization.
5. There is absolute confidence and mutual understanding in dealing with the private practitioners of medicine in the community.
6. Modern advances in equipment and in methods are adopted as soon as they can be adapted to the local needs.
7. The case finding program is changed as local experience indicates the direction for such modification.
8. This program is carried out for a relatively small proportion of the expenditure for public health purposes.

Best Sellers in the Book Service for August

An Appraisal Method for Measuring the Quality of Housing: A Yardstick for Health Officers, Housing Officials and Planners. Part I. Nature and Uses of the Method. American Public Health Association. 1945 ..... $1.00

The Control of Communicable Diseases. American Public Health Association. 6th ed., 1945 ..... .35

Global Epidemiology. James S. Simmons, M.D., Tom F. Shayne, M.D., G.W. Anderson, M.D., and H. M. Horack, M. D., 1944 ..... 7.00

National Health Agencies. A Survey With Especial Reference to Voluntary Associations. Harold M. Cavins. 1945 ..... 3.00

Health Instruction Yearbook, 1945. Oliver E. Byrd, Editor. 1945 ..... 3.00

Municipal and Rural Sanitation. V. M. Ehlers and Ernest W. Steel. 3rd ed., 1943 ..... 4.00

Vital Statistics Directory. American Public Health Association. 3rd ed., 1945 ..... .75

Diagnostic Procedures and Reagents. American Public Health Association. 2nd ed., 1945 4.00

Nursing in Prevention and Control of Tuberculosis. H. W. Hetherington, M.D., and Fannie Eshleman, R. N. Rev. ed., 1945 ..... 3.00

Order from the Book Service

Biochemical Methods in Nutritional Surveys*

OTTO A. BESSEY, PH.D., AND OLIVER H. LOWRY, PH.D., M.D.

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THAT there is a relation between nutritional status and growth, development, and general health at many levels of nutrition is an accepted and well established fact. However, the exact quantitative relation between the various levels of nutrition and the degrees of health is not so clear.

Except for those levels of nourishment so low that obvious signs and symptoms of deficiency disease result, it is difficult to measure nutritional status. Likewise, except in cases of severe malnutrition, it is not easy to evaluate the influence of nutrition on health. The two most important needs in the field of public health nutrition are:

1. The development of more practical and adequate methods for the evaluation of nutritional status
2. The acquirement of accurate knowledge concerning the influence of nutrition on health at all levels of nourishment

These two needs are not independent. It will be necessary to find adequate methods of measuring nutritional status on large groups of people before completely satisfactory and applicable knowledge concerning the relation of nutrition to health can be obtained.

There exists considerable evidence, derived both from studies with experimental animals and from observations on man, which indicates that there is a distinct difference between the level of nutrition just adequate to prevent obvious signs and symptoms of malnourishment and that level which will support the maximum growth, development, and general health potentialities. This evidence has been recently reviewed in a bulletin published by the National Research Council[1] and need not be repeated here. However, it should be pointed out that the farmer has been convinced of the importance of this difference between "just adequate" and "optimum nutrition" for some years. An increased biological efficiency, as reflected in superior production of eggs, milk, wool, meat—tangible results which can be evaluated in dollars—makes a convincing demonstration of the benefits to be derived from optimum nutrition as compared with "just adequate" nutrition under like circumstances. It seems reasonable that man would likewise derive additional benefits by better nourishment—which, in turn, would become evident in the form of better health performance. The limited observations on man indicate this to be true; however, present knowledge is scant and insufficiently quantitative. There is great need for well controlled, long-term observations on the health performance of large

* Based on a paper presented at a Joint Session of the Vital Statistics and Food and Nutrition Sections of the American Public Health Association at the Seventy-third Annual Meeting in New York, N. Y., October 3, 1944.

groups of subjects which, in so far as possible, differ only in level of nutrition. Such a study would be indeed a large and ambitious undertaking. But it seems unlikely that a completely satisfactory answer to the problem of the relationship of nutrition to health in man will be found by other methods. It must be admitted, of course, that strong, indirect or incomplete evidence is often convincing in itself if there is enough of it.

There are several methods of approach to the problem of methods for evaluating nutritional status. There are the dietary history methods used to determine what the subject has been consuming in terms of dietary essentials; the clinical methods based on observations of signs and symptoms of deficiencies; and, finally, there are laboratory methods used to measure some physiological function relating to nutrition, or the concentration of the various dietary essentials present in body fluids. All of these methods, when properly used, have contributed and will, undoubtedly, continue to contribute to the problem of measuring nutritional status. The method or methods of choice for any one investigation should, of course, be greatly influenced by the particular conditions. In some cases, dietary histories will yield information of sufficient reliability and scope to serve the purpose. In other cases, careful clinical studies will be found most suitable, perhaps using laboratory methods for confirmation. In other words, the best use of those methods now available depends upon a thorough knowledge of the strong and weak points of each of the methods and good judgment as to the circumstances under which they can be applied to obtain reliable results. The wrong application of a reliable method will yield unreliable results just as certainly as the use of faulty methods.

In the present state of development of this subject, it is not easy to determine the nutritional level of individuals or groups even by the use of all the methods mentioned above. Although limited amounts of useful data are being obtained and steady progress is being made in connection with this problem, it is obvious that methods must be greatly improved before a really satisfactory procedure will become available for use on a large scale. The present methods are reliable, at best, only in the hands of experts. Such diagnostic procedures are thus useful only in connection with well planned investigations, they cannot be thought of as nearing the stage where they can be used in the way that serological tests, such as the Wassermann test, etc., are now used.

In a general way, the concentrations of many of the nutritive essentials (minerals, vitamins, proteins) in the blood, urine and other body fluids reflect the recent dietary intake of these substances. This fact is the basis of a number of chemical procedures for measuring nutritional status. Methods are now available for the determination of several of the vitamins in the body fluids (vitamin A, thiamine, ascorbic acid, riboflavin, nicotinic acid). In the hands of skilled analysts these will yield reliable data in so far as the purely technical procedure of analysis of body fluids and tissues is concerned. However, these methods need to be made more practical. They usually require large specimens, and the often laborious and technical nature of the procedures limit the number of determinations which can be conveniently carried out. Another serious handicap in the use of these methods is the lack of the knowledge necessary for interpretation of the analysis in terms of the nutritive state of the individual. Although there is in general a correlation between dietary intake and concentration in the blood and other body fluids, there are other

factors which also influence the concentration. In addition, the concentration does not usually bear a linear relationship to dietary intake. These facts limit the scope of usefulness of chemical methods, because the methods may only be safely used under conditions which exclude the influence of the disturbing factors. This limitation undoubtedly will be greatly reduced with further understanding of the physiology and biochemistry of the vitamins, subjects which require extensive investigation.

The rapidly growing realization that nutrition plays a very important rôle in health has frequently led to haste in trying to apply the knowledge gained from animal studies and the laboratory to man. Furthermore, there has been a demand for technical methods and their use before there has been sufficient time and opportunity to develop sound, well tested, and practical procedures. Some of the disappointment resulting from the use of chemical methods arises from a lack of understanding of the care with which any chemical method must be used in order to yield reliable results. Unless the analyses are performed under the supervision of someone who thoroughly understands the pitfalls of the method, one cannot have confidence in the results. The literature contains many examples of surveys which are useless because of the lack of attention to this point.

Some of the difficulties in the use of chemical methods for nutrition surveys have been indicated above. What can be done about these difficulties?

There is a real need for the development of analytical methods which can be applied to large population groups without the difficulties now encountered. Collection of blood samples by venipuncture, tolerance tests requiring several specimens, or urine collections over a prolonged period are not practical procedures for large group investigation. Such procedures are laborious, time-consuming, require too much equipment in the field, and cause too much distraction and too many problems in obtaining the specimens.

Recently we have been interested in trying to develop microchemical procedures whereby very small samples of blood and other tissues could be analyzed for the various nutritive essentials. There would be many advantages to such procedures, especially if finger-tip blood were sufficient, Of course, the use of such methods would not circumvent the many problems of interpretation which have been raised, but, with such techniques available, certain group studies and animal experiments which are needed for clarification of physiologic aspects of the problem would also become more feasible.

Theoretically, there is no reason why blood analysis for the nutritive essentials cannot be done on very small specimens without loss of precision. The problem simply requires the development of the proper new tools for such small volume operations. We now have in use in our laboratory micro methods for seven of the nutritive essentials or their corresponding tissue derivatives. These methods have been thoroughly tested for reproducibility and accuracy against the usual macro methods and by other standards, and are very satisfactory in this respect. They have also had a limited field test on about 1,000 subjects, which demonstrated the simplicity of obtaining and preserving specimens, and the rate at which the determinations could be done. All seven determinations which consist of vitamin A, carotene, ascorbic acid, riboflavin, serum protein, hemoglobin, and phosphatase can be done on two or three drops (0.1 ml.) of blood. Details of the methods and proof of their reliability will be included in a series of papers which are currently being pre-

pared for publication. However, I would like to describe briefly some of the procedures, the tools used, and the time involved.

Blood is collected from the finger tip into two capillary tubes, 50 cu. mm. in each. One tube contains an anticoagulant, heparin, while the blood in the other tube is allowed to clot. The tubes are closed with wax and returned to the laboratory for analysis. Two people can collect about 25 specimens per hour. In the laboratory the tubes are centrifuged, and by use of special pipettes, aliquots of the various blood elements are removed for analysis. With special microconstriction pipettes, volumes as small as 2–3 cu. mm. can be measured quickly and accurately to ±0.5 per cent.

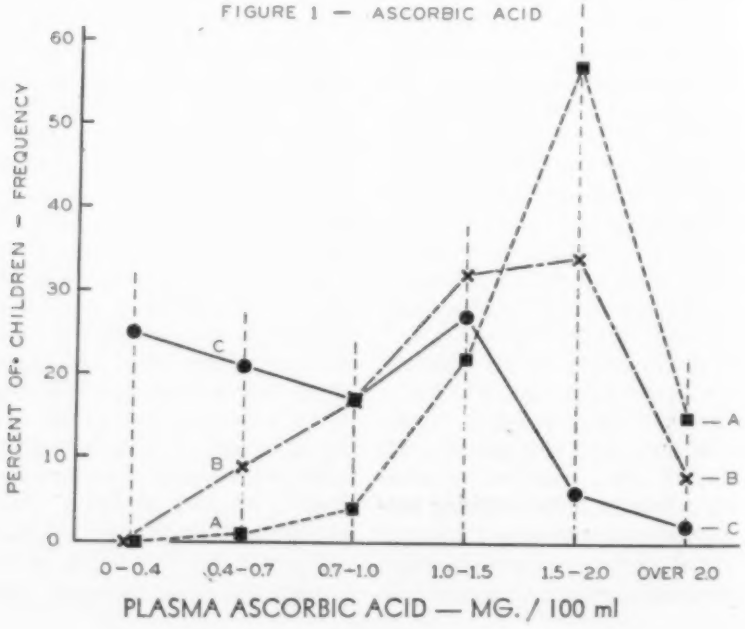
Ten cu. mm. of serum are removed for an ascorbic acid analysis by use of the dinitrophenyl hydrazine reaction (Roe). After preparation of a filtrate of the serum, a color proportional to the ascorbic acid content is developed by the addition of the appropriate reagents. The intensity of the color is measured in a Beckman spectrophotometer by the use of a special optical cell which requires only 30 cu. mm. volume. One technician can do about 50 determinations a day.

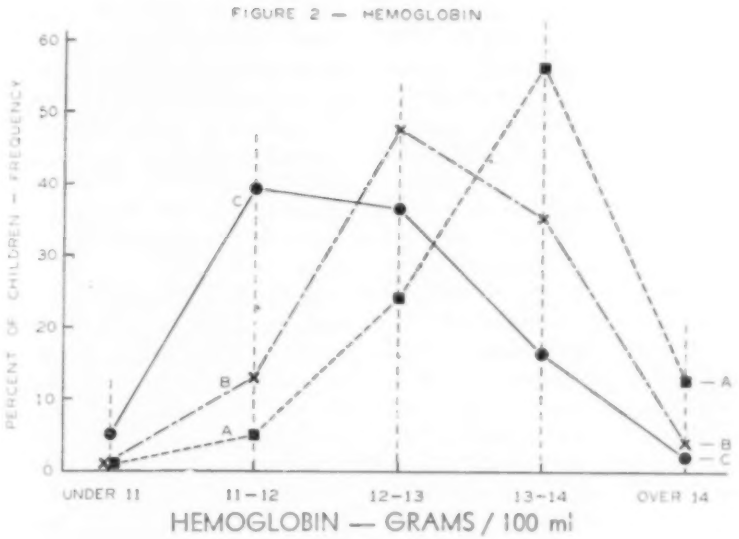
Three cu. mm. of serum are removed for a phosphatase determination by a newly developed method. In this method the serum is incubated 30 minutes at 37° C. with 50 cu. mm. of reagent, sodium hydroxide is added, and the intensity of yellow color which develops is read in a microcell in a photoelectric colorimeter. One technician can do about 100–200 determinations a day.

Two to 5 cu. mm. of serum are required to measure the serum proteins by the use of the Linderstrøm-Lang gradient tube. One technician can do 150–200 determinations a day.

Vitamin A and carotene are measured on 35 cu. mm. of plasma after saponification and extraction of these substances into immiscible solvents. In the special

FIGURE 1 — ASCORBIC ACID





micro-optical cells used for ascorbic acid, the absorption of carotene at 460 mμ is measured. Likewise, the absorption at 328 mμ is measured. The vitamin A is then destroyed by irradiation at a selected wave length of ultraviolet light, and the difference between a new measurement at 328 mμ and the original measurement allows one to calculate the vitamin A.

Riboflavin is determined on 15 cu. mm. of red blood cells. This is done by measurement of the rate of acid production by *Lactobacillus casei* in a medium in which riboflavin is the limiting nutritional factor for the bacteria. This method, previously developed by others, has been adapted to a micro scale.

Hemoglobin is measured on 10 cu. mm. of whole blood after dilution by light absorption in a photoelectric colorimeter.

These microchemical techniques offer an advantage not only in regard to the problem of procurement of specimens, but also in the rate at which the determinations can be performed. It should be pointed out that for some methods, instruments are used which cannot be carried into the field. However, with present-day transportation methods, it is no longer necessary to plan to do all determinations in the field. One of us (O. H. L.) used the above described micro methods as part of a survey in Newfoundland. A kit weighing less than 100 pounds was all that was required in the field. Some determinations were made there, while other specimens were prepared for shipment in dry ice to the laboratory. Several weeks elapsed before certain determinations were done. This is made possible by preserving the specimen by freezing.

We are also using the micro methods for certain experimental studies on the physiology and biochemistry of the vitamins. Sufficient blood can be obtained repeatedly from a small experimental animal (i.e., 50 gm. rat) for analysis, whereas previously it was necessary to use pooled specimens from several animals in order to have sufficient material. Micro methods are of distinct advantage in studies of this type.

A full report on the results of the surveys in which the micro methods have been used is being prepared for

publication and, therefore, only a brief comment on this material will be made here. The analyses of large numbers of specimens offered no difficulties and proceeded with good economy of time. Likewise, the precision of analysis under such circumstances was satisfactory. Figures 1 and 2 summarize the results of determinations of ascorbic acid and hemoglobin on three groups of New York school children (A, B, and C) of different economic backgrounds, and illustrate how the methods can be used for group studies. Each group numbered about 75. Group A came from a high economic area of the city, group C from a very low economic area, and group B from an area of intermediate economic circumstances. The points on the vertical lines show the percentages of each particular group which had analytical values falling in the zone indicated by the figure at the base of the line; i.e., in Figure 1, 60 per cent of group A had plasma ascorbic acid levels of 1.5–2.0 mg. per cent while only 5 per cent of those in group C had ascorbic acid values in the same range. Although there were no children in group A having an analysis below 0.4 mg. per cent (considered a subnormal level) there were 25 per cent of the children in group C below this level. It will be noted that a like distribution is also found for the hemoglobin determinations.

It is quite evident that there are measurable differences in the nutritional status of these groups. What these differences mean in terms of health is, of course, another problem. In this phase of the work the objective was to develop simple, practical, reliable chemical methods which would be helpful in measuring the nutritional status of large groups of children. We feel that a step in that direction has been made.

REFERENCE

1. National Research Council, *Bull. 109*, Nov., 1943. Report of Committee on Diagnosis and Pathology of Nutritional Deficiencies. Food and Nutrition Board. Inadequate Diets and Nutritional Deficiencies in the United States.

WANTED: BACK ISSUES OF THE AMERICAN JOURNAL OF PUBLIC HEALTH

Again the Central Office is sending out an SOS for *Journals* that are out of stock and which are especially needed now to complete sets for the countries that have been occupied and which now are requesting help in rebuilding their technical libraries. The *Journals* that can be used for this purpose are listed below:

1941—January, April, July, August
1942—January, March
1943—January, March, August, September, October, December
1944—June, August
1945—January, February, March, April

Members who can return any of the above *Journals* to the A.P.H.A. are requested to do so collect.

Medical Coöperation with the Fort Greene Industrial Health Committee*

CHARLES F. McCARTY, M.D.

Director, Medical Activities, Kings County Medical Society, Brooklyn, N. Y.

THE Fort Greene Industrial Health Committee is a coöperative venture of many agencies, and my part in this program is to describe the place of organized medicine in this committee. Without the wholehearted support of management, both its financial support and its assistance in forming Health and Safety Committees, we could not exist. Without the support and stimulation which we receive from labor and from all workers, we could not obtain results. The New York City Department of Health, through Commissioner Stebbins and Dr. Landes, has been our guide and sponsor. They have given us quarters for our office and they have helped us not only with advice but with materiel and with personnel in every way possible. The local and national health and social agencies have also played a large part in this work.

For many years, the Medical Society of the County of Kings has been particularly interested in teaching health to the general public. Members of our Society have given lectures on all types of health subjects before Parent-Teacher Associations, Mothers' Clubs, Union meetings, etc. We also have given one or more radio talks or radio dramatizations on health subjects weekly. In 1943 we were forced to discontinue much of this work because over 40 per cent of the doctors in Brooklyn were in service and the others were busy with hospital and other work. Although we were unable to give as many health talks to the laity as we had been doing for years, it did not mean that our Public Health Committee or our Comitia Minora had lost interest in public health education. In 1941, our County Society established a Committee on Industrial Health with Dr. Irving Gray as Chairman. This committee gave a course on industrial medicine which was attended by about 80 physicians. To the best of our knowledge, this was the first course of its type ever given by a county society. The following year, the Long Island College of Medicine inaugurated its course on industrial medicine, and we felt that it was no longer necessary for us to continue this work.

As Director of Medical Activities of the Medical Society of the County of Kings, I was asked to act as Secretary of the Fort Greene Industrial Health Committee and, later, to help with the organization of its work. This request received the unanimous approval of the Comitia Minora, the governing body of our Society.

It is planned that the work of the Fort Greene Industrial Health Committee be carried on through local Health and Safety Committees in each of the participating firms. Dr. Landes and I, or either of us, have met with a great many Health and Safety Committees, or with representatives of firms

* Based on a paper presented at a Joint Session of the Industrial Hygiene, Public Health Education, and Public Health Nursing Sections of the American Public Health Association at the Seventy-third Annual Meeting in New York, N. Y., October 5, 1944.

located in the Fort Greene area of Brooklyn, and have found that not only is management enthusiastic for our program, but the workers themselves are interested in health education. A typical Health and Safety Committee in a plant or store consists of a representative from management—usually the personnel director—representatives of the medical department—when the firm has such a department—and representatives from each group of employees; i.e., union representatives, supervisory staff, office staff, sales people, mechanics, maintenance departments, etc. On the whole, the firm physicians and nurses have been very enthusiastic and very helpful about our work.

These committees are expected to meet at regular intervals and discuss the health problems with that particular plant and store and to plan for the health education of the workers in the plant.

The Industrial Health Committee has engaged the services of a full-time, trained health educator whose prime duty it will be to see that these committees are organized and that they function.

We are planning an Institute for health and safety committee advisers. This Institute will be under the direction of Henry Ockerman of the Zurich Insurance Company, who has had a large experience in the organization and training of similar committees for his company. It is expected that this Institute will be attended by workers from the various coöperating health and social agencies, and that each worker will, after attending the Institute, assume the direction of one or more plant Health and Safety Committees. The health educator of the Fort Greene Industrial Health Committee will always be on call to assist with the organization of these committees and to give them advice in the planning of their programs.

We have endeavored to locate the sources of material available for the use of these committees in carrying out their program, and find that there are not many films available on health subjects which are suitable for lay audiences. For this reason, we welcome the idea of the health films which Dr. Landes has described to you.*

We also find that many pamphlets and posters which have been available in the past can no longer be obtained. If we are properly to carry out this program of health education, the committee will probably be obliged to produce many additional pamphlets and leaflets on health subjects.

The Industrial Health Committee is planning to offer to the local committees from two to four health subjects a month as educational material. The Industrial Health Committee will provide speakers, posters, movies, and pamphlets as desired by the local committees on these subjects, and the subjects will follow, as nearly possible, the subject matter of the current tabloid.

The movies or talks are to be given during the lunch hour, after work, on time assigned by the company, or at union meetings. We are at present prepared to give talks on any medical or health subject which is requested, and movies and pamphlets on colds and pneumonia, tuberculosis, appendicitis, venereal disease, safety, cancer, and many others.

The Fort Greene District of Brooklyn is largely industrial, containing a few large industries, but they probably have more diverse small industries, many of which are directly engaged in war work, than any other similar number of square miles in the world.

Each of these industries has its own individual health problems. In many of the industries, most of the employees

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* Landes, Jacob. H. Plan of the Fort Greene Industrial Hygiene Committee, *A.J.P.H.*, 35, 6:602 (June), 1945.

are women. Many of the women employed in the candy industry, for instance, are married and have small children. In some of the others a large number of young girls are employed. In some small factories nearly all of the employees are older men who are skilled mechanics. The health problems in these various plants, stores, and factories, differ greatly. The laundry worker and the department store clerk have different health hazards, as do the workers manufacturing heavy machinery and those manufacturing light springs.

In order that the Fort Greene Industrial Health Committee can be of value to all workers in the area, its program must be fitted to the individual needs of the employees in each participating firm. Our first definite venture in health education for the worker while on the job was the tabloid, "Here's To Your Health." This tabloid is published twice a month and is distributed to each employee in the coöperating firms. In some firms, this tabloid is distributed with the plant paper, and in others, it is distributed by the guards.

During a recent month, we were led to believe that employees of coöperating firms were not reading the tabloid and, for this reason, we sent letters to fifteen coöperating firms asking whether they would be willing to sample about 5 per cent of their employees as to the employees' reactions to the tabloid. Ten firms stated that they would be willing to make the survey and to date replies have been received from six of these firms. We find from this that in the firms where the survey has been conducted, 86 per cent of the employees receive the tabloid. Of these, 91 per cent state that they read it, 48 per cent take it home to their families and their families read it, and 82 per cent feel that it is of real value. A few of the criticisms which we received are as follows:

"Causes of various ailments stressed, but not enough preventive or treatment explanations."

"I think a short article in each issue about some medical development would be interesting—say Rh Factor, Penicillin, or something of the sort."

"Seasonal subjects could be stressed with each issue, along with one general item."

"Physical benefits of exercises explained."

"Longer and more scientific articles."

"More facts on diets—reducing, gaining, and energy-building."

"More question and answer columns."

"More specific information on health and disease."

"Encourage contributions by readers."

The Industrial Health Committee has made plans by which x-rays may be taken of all employees in each coöperating firm. In firms having 100 or more employees, these x-rays will be made on the job by the Industrial Health Committee through the Brooklyn Tuberculosis and Health Association. These films will be read by physicians approved by Brooklyn roentgenologists, and the follow-up of suspicious cases and complete diagnosis will be made by the New York City Department of Health. In individual cases or in small firms, the x-rays will be taken either at the offices of the Brooklyn Tuberculosis and Health Association or in the Fort Greene Health Center. The Industrial Health Committee will report to the firm physician and to the employee all cases in which these films are negative. On those films which show pulmonary tuberculosis which is contagious, or pulmonary tuberculosis in which the employee should not work or should have his job changed, a report will be made to the employee, the firm physician, and to the employee's physician.

The Industrial Health Committee, through the information service of the Medical Society of the County of Kings, will inform any employee in need of medical care as to where he can obtain the services of a general practitioner or a specialist in his neighborhood, or, if he cannot afford to pay for these services, he will be informed as to free

services available. The Medical Society receives, at present, an average of twenty requests per day for information concerning where persons may receive medical care.

Dr. Landes mentioned the fact that in many of the firms which we have visited management is interested in planning for some type of medical service. All of the members of the committee feel that health education of the worker is not enough, and that medical care for the worker on the job and health advice in individual cases, must be made available. This advice and care should be given by doctors and nurses trained in industrial medicine and informed as to the needs of the individual plant.

The committee hopes that as soon as enough doctors return from the Army and Navy, we will be able to plan a medical service for small industry, to be paid for by industry on an hourly basis. The committee does not feel that medical problems or medical care not related to the employee while he is working are its function, but that home and hospital medical care are the functions of others.

It is my belief that with the support which we are receiving from management, from labor, from the Health Department, from the volunteer agencies, and from the medical profession, this venture in the education of the worker on the job will be a success.

More Official Approval of the Control of Communicable Diseases

With the second large printing of *The Control of Communicable Diseases*, Sixth Edition, UNRRA's approval is added to the list of official acceptances of this important Report.

Its copyright page now carries, with the permission of the agencies involved, the fact that it is official with the U. S. Public Health Service and the U. S. Navy; has been approved in principle by the Surgeon General, U. S. Army; that the text of many of the diseases was prepared in agreement with representatives of the Medical Staff of the British Ministry of Health; that it has been recommended for adoption as an official statement by the National Health Administration of China; and that its epidemiologic information has been approved for distribution to the staff of UNRRA.

Ten state and three city health departments have adopted the Report and are distributing it over their imprints. In six states and as many cities, it is under consideration for adoption.

Chile is the first of the South American countries to accept it, with others soon to follow.

In Canada, the Dominion Council of Health has resolved "that the Federal Department of National Health and Welfare secure a sufficient quantity of the new publication for fairly wide distribution among public health personnel of the various Provinces. Each of the Provinces is to be permitted to insert one or more pages in the booklet, drawing attention to any variation in the regulations in force in that particular Province and those control measures that were suggested by the A.P.H.A. booklet." A formal declaration of approval by the Newfoundland Government has been received.

Nearly 100,000 copies of *The Control of Communicable Diseases* have been printed up to this time in English, 40,000 copies for the Office of War Information for use outside the United States. Accurate figures are not available for the foreign editions, Spanish, Portuguese, Italian, French, and Chinese, but will total well over 25,000.

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THE PROBLEM OF AIR-BORNE INFECTION

THE major purpose of this *Journal* is to present new and significant advances in the public health sciences and in public health practice. It has, however, been the feeling of the Editorial Board that such concrete and specific material might well be supplemented by occasional articles of wider scope presenting background material and outlining broad trends in certain important fields. The leading article in the present issue is the first of a series of such special review articles to be prepared on the request of the Editorial Board.

In this contribution, Dr. J. E. Perkins discusses the vital problem of control of air-borne infections. It is of special interest that this review is prepared from the standpoint of one of our own subcommittees.

The contributions of the Wellses (and, independently, of Hart at Duke University) have made it abundantly clear that the problem of atmospheric dissemination of disease germs (particularly viruses, but also certain bacteria) is a real and important one. Issues of the *American Journal of the Medical Sciences* for last spring contain a wealth of material on this subject.

Here is a broad new field of environmental sanitation; and in this field there are two major questions to be answered.

First, in what places, and under what conditions, is the problem of infection by droplet nuclei of sufficient practical importance to warrant specific programs of control? The case seems reasonably clear for the operating room and the contagious disease ward. The Wellses' work indicates a field of sanitary ventilation beyond the hospital and strongly suggests that hazards in the school classroom (and presumably in the auditorium) may be sufficient to warrant control measures. General adoption of the theory must await a broadening of the base and deepening of the salient of experience since final decision on actual classroom procedure must await further epidemiological experimentation in the actual classroom; and it is gratifying that in New York State and other places carefully controlled comparisons are being made of disease incidence in protected and unprotected rooms.

The second question—where control of the microbic content of the air seems desirable—is, what methods are most effective and most economical? It has been

demonstrated that the use of either ultra-violet light or of aerosols may be highly efficient; and the treatment of floors and furniture (or bedding) with absorptive materials has also proved of value in reducing atmospheric pollution.

To arrive at sound engineering conclusions, three steps seem essential:

a. Standard laboratory methods for quantitative estimation of microbic pollution in the atmosphere must be agreed upon. It is encouraging that a joint meeting of the various committees mentioned by Dr. Perkins was held in June and arrived at substantial agreement on this point.

b. Extensive quantitative studies must be made in various occupied places, using identical and comparable methods, so as to provide a reasonably accurate standard (perhaps based on the number of hemolytic streptococci present) to distinguish a safe atmosphere from a dangerous one. Such a standard should be as basically useful as was the colon test in the evolution and testing of processes for purifying water.

c. Finally, such a standard must be applied under practical conditions to the testing of various procedures for the purification of the atmosphere so as to establish the quantitative efficiency and economy of each, in order to meet the old definition of the engineer as "a man who can do for one dollar what any fool can do for two."

It is fortunate that all the committees concerned, representing both the A.P.H.A. and the A.S.H.V.E., are coöperating closely in a program leading toward these common and essential ends. Their conclusions may well open the way to a new field of environmental sanitation of major importance to human health and welfare.

A THIRD OF THE NATION WITHOUT HEALTH PROTECTION

THE Committee on Administrative Practice devoted its earlier efforts to the development of standards of procedure and personnel for a local health department of optimum adequacy. Such a department, costing $2.00–$2.50 per capita per year, is now in operation in many urban and a few rural communities; and experience has shown that the ideals of the committee were reasonable and sound. In recent years, through Dr. Haven Emerson's Committee on Local Health Units, the C.A.P. has given special attention to the problem of our more backward areas. It has reminded us that while we should still strive for even higher attainments in prosperous centers, we must not forget the crying need for bringing at least a minimum of modern health protection to our less fortunate fellow-citizens. A report by this committee on "Local Health Units for the Nation" published last month by the Commonwealth Fund is a document of primary importance. Its results are summarized in this issue of the *Journal* by Dr. Emerson and Miss Luginbuhl.

The committee finds that 40,000,000 of our people are still living "under substandard local health organization, ill-equipped to give basic minimum health protection." It suggests as an immediate goal, the extension to all areas in the United States of at least a minimum of health service including vital statistics and public health laboratory service, environmental sanitation, communicable disease control, hygiene of maternity, infancy and childhood, and health education—at a cost of $1.00 per capita.

To attain this end, it is first of all essential to break away from our present archaic local political units and create new health areas, corresponding generally to counties or groups of counties, and of a size sufficient to make possible efficiency and economy of operation. Instead of the fantastic number of 18,000 local administrative health units now in operation, the committee proposes the creation of 1,197 units covering the entire country. Specific areas have been suggested for these units and have received approval, in principle, from the state health officers of all but two states. Eighty-six per cent of the suggested areas have populations of over 45,000 persons.

With such reasonable administrative districts, relatively modest appropriations would make possible minimum health service for all our people. In 1942, we were spending 77 million dollars for local health service, or 61 cents per capita; a minimum of 127 millions, or 97 cents per capita, is proposed by the committee. From the standpoint of personnel, the Emerson plan contemplates the entire elimination of over 4,000 part-time health officers and a slight reduction of full-time administrative medical personnel; with an addition to the present forces of 1,500 part-time clinicians, 13,000 public health nurses, 300 sanitarians, 3,700 clerical and statistical workers, 2,220 laboratory workers, 2,500 dentists (mostly part-time), 3,900 dental hygienists, and 500 health educators.

These figures provide only for minimum service and do not include the progress already made in those urban communities which are now spending more than 97 cents per capita—and the future progress which must be made in all communities toward the really adequate $2.00 per capita service which should ultimately be attained. The report, however, presents a clear challenge to us to bring our less fortunate areas up to at least the minimum set by the Committee on Local Health Units. The present unevenness of health protective services in the United States is nothing less than a national disgrace. It contravenes our charter as a nation which recognizes the fundamental right of all Americans to life, liberty, and the pursuit of happiness; for life, liberty, and happiness require health as a prerequisite.

ACCREDITATION OF SCHOOLS OF PUBLIC HEALTH

DEMANDS for public health training are certain to be greatly increased when the war in the Pacific comes to its ultimate close. The proportion of physicians now in military service who will wish to enter the field of health administration may or may not be correctly represented by the results of an A.M.A. questionnaire published some months ago. It is clear, however, that the absolute number of such physicians will be sufficient to overtax seriously our available resources for sound basic training in public health. In addition, there will be many non-medical men whose military experience will lead them to consider careers in the field of environmental sanitation. Financial barriers to advanced training will be largely removed by the provisions of the G I Bill of Rights; and, in the granting of scholarship aid under this bill, the federal government will be faced with the responsibility of insuring that the federally-supported student gets his money's worth.

To meet these needs for postgraduate education, we have a small number of well equipped schools of public health, whose procedures have been developed,

individually and experimentally, during the past quarter-century to the point where a considerable agreement on an adequate and balanced program has been reached. We are also, however, faced with other institutions—in larger numbers—which offer courses in public health without adequate programs or competent faculties. Some of these institutions are honestly striving to meet a need with limited resources. Some are merely seeking to attract students by deliberately and grossly misleading prospectuses.

It is, therefore, urgently necessary to establish reasonable standards for institutions which may safely be entrusted by the federal government with the serious responsibility of training its temporary wards—to protect the student from exploitation and the public against incompetent service by inadequately trained personnel. Such standards would also be of great value to foundations and individuals providing aid for public health training; to appointing boards and administrators in the evaluation of the qualifications of candidates for posts; and to the educational institutions themselves in the improvement of their curricula and in securing financial support for such improvement.

In recognition of this need, the American Public Health Association has been invited by the two agencies most vitally concerned with this problem to undertake a program for the accreditation of institutions which may be considered as competent to offer courses of postgraduate training in public health. The Committee on Post-War Training of Public Health Personnel appointed by the Surgeon General of the United States Public Health Service at a meeting last April reaffirmed a former request to the Association to undertake this important task. An identical request was made in the same month by the Association of Schools of Public Health, representing the leaders in this field of university education.

Since 1942 [1] the Committee on Professional Education, under the chairmanship of Dr. W. P. Shepard, has had this subject under consideration; and it is gratifying to announce that funds for undertaking the task involved have now been provided through the generosity of the Commonwealth Fund of New York City. The committee expects to get to work at once and hopes before the end of the present calendar year to present a preliminary list of certain institutions which are clearly qualified to provide courses leading to the M.P.H. degree.

In undertaking this work, the committee is keenly aware of the dangers of overstandardization. In the complex field of public health, any such crystallization of courses and hours as is now in force in medical education, would be most unfortunate. It is essential, however, that certain basic requirements should be met with regard to such criteria as reasonable independence of administration, budget, number and qualifications of faculty, admission requirements, general scope of curriculum, library and laboratory facilities, and opportunities for such field experience as falls within the scope of a basic year's training in public health. (Training in the field, following or preceding the first year's course [corresponding to a hospital residency] is a question to be considered separately and a problem for the health departments rather than the schools.)

Accreditation will be based on the submission by any institution applying for recognition of an appropriate questionnaire and on a visit to the institution by a representative of the committee. A copy of the report of the staff will be submitted to the administrative head of the institution before submission to the Committee on Professional Education, and the committee will provide a hearing to him or his representative if desired. Decisions of the committee will be finally subject to approval by the Executive Board of the Association. In certain cases,

provisional accreditation may be granted, subject to the fulfillment of specified requirements within a stated time.

It is planned to concentrate first on the basic one year of training qualifying for the degree of Master of Public Health (in Canada, Diploma of Public Health). At the same time, or subsequently, a list of institutions will be accredited for the more advanced degree of Doctor of Public Health, perhaps involving specialization in particular administrative or clinical fields. The actual content of the second year would obviously not be uniform.

At a later date, it is planned to extend the program to consideration of facilities for M.P.H. training adapted to particular specialties such as health education; to such general university degrees as the M.S. and the Ph.D., which are given without specific designation but with specialization in basic areas related to public health (such as bacteriology or statistics); to specialized degrees in engineering and other fields related to public health; and to administrative areas suitable for practical field training before or after the basic M.P.H. year.

This is a large and a responsible task; and the Association bespeaks a maximum of patience on the part of fund-granting, educational, and administrative authorities. Requests for a list of institutions accredited for certain specialties have already come to the Association, which cannot be met without months of study. We are building for a long future, and the groundwork must be firmly laid.

REFERENCE

1. Minimum Educational Facilities Necessary for the Postgraduate Education of Those Seeking Careers in Public Health—Adopted by the Committee on Professional Education, *A.J.P.H.*, 32:533 (May), 1942.

RECORDS

THERE are few functions of the health department, or the Visiting Nurse Association, which are so commonly a cause of complaint as that of record keeping. To both doctor and nurse "paper-work" is commonly a bête noire. Yet they know that a fever chart or a graph of annual disease incidence is something more than "paper-work." It means something to them. It is an inextricable part—an essential condition—of the work they are doing. All records which deserve to be kept at all are, for someone, essential to efficiency. But the person who makes the original entry does not always realize this important fact.

Records are *not* a necessary evil. They should be beacons that light the way. A physician cannot be expected to treat a syphilis case from memory. A nurse cannot carry in her mind the varying patterns of households. Nor can a sanitarian remember all the things that went on before on various premises. Notices must be sent out. Names and addresses must be recorded. Expenses must be jotted down. Memoranda of conversations and decisions at meetings must be noted. They may be as significant in the evaluation of community opinion as is the chart of a sound child's growth an index of its health.

We can't escape making records—nursing, sanitary, clinic, school, financial; but we can be discriminating in what we record. Records are only valuable if they are useful—and if they are used. Periodic review of records should be an essential factor of good health administration.

What item is useful, what is not? What item is rarely filled out? These are not insignificant details. It is startling to visualize the total staff time spent in keeping records. We recall the choice example of a record form—several large

sheets consuming two weeks of a clerk's time to fill out monthly—that was still being faithfully made out three years after the person who asked for it had died. It was being filed regularly but no one used it. No one could recall what it was for. It was an activity lost from sight in the dim mists of unreviewed routine.

There is pay-dirt in record reviewing. It is the key that opens the door to accomplishment. Ten unnecessary items filled in daily by ten nurses mount up in time consumed. A slight change in form may change a dead item to a live bit of useful information. Does the record give the type of data that helps in guiding the program? Is it useful in supervision? Is an item presented in such form as to be reliable?

The size and the form of the record card may be of fundamental importance. We recently noted that the health department in a certain city used two different forms for the record of each tuberculosis case, both of awkward and unusual size, and neither of much value without reference to the other. The Visiting Nurse Association of this city had all the essential data on two sides of a standard size card.

The tabulation of data noted on records is another essential factor—sometimes neglected, sometimes carried out as a dead and meaningless routine. We should ask ourselves here: What tabulations are necessary? How often should they be made? Do we need to tabulate a whole drawer full of cards? Have we experimented with short cuts or sampling? Will 25 cards here, 25 there, and 25 from a third place give essentially the same answers as tabulation of the whole 500 cards? Sampling is not, of course, suitable in determining total volume or in dollar and cent transactions but it is often useful in revealing distribution and relative frequency in many fields of public health activity.

We are inclined to believe that periodic review of records and their uses is a basic administration responsibility and that the person assigned to this task—not necessarily a super-statistician—should occupy a key position in the health staff household. The student of record methods and record uses, has a much bigger part to play than we have hitherto recognized.

This function should be borne in mind, not only in the health department but also in the school of public health. Are such matters teachable? Have they been given weight in our schools of public health? These problems crop up every day. They are endemic, as every health officer knows. Haven't they a place alongside such technical subjects as epidemiology, municipal sanitation, and bacteriology?

Examination of Water and Sewage*

Laboratory Section

SINCE the submission of the completed manuscripts on the microscopy and bacteriology of water and sewage last year to the Editorial Committee, your committee has been interested primarily in further studies of the bacteriology of water as it pertains to standards of analysis.

Mr. McCrady, referee on bacteriological methods reports as follows:

"There has been a marked paucity of contributions to the literature of bacteriological methods of water examinations during the past year or two. Laboratory workers have had little time for any but the most essential and pressing research work.

Perhaps the most interesting recent contributions have been the development of a new medium for the detection of *Streptococcus fecalis*,[1] by Hajna and Perry, and a report by the same observers[2] on a further evaluation of the so-called "E C" medium, a buffered tryptose lactose bile preparation by Perry,[3] and Hajna and Perry[1] for detection of the presence of coliform organisms by incubation at 37° C. and of *Escherichia coli* by incubation at 45.5° C.

The new "S F" medium for *Streptococcus fecalis* employs sodium azide (1–2,000) to inhibit Gram-negative organisms and a selective incubation temperature of 45.5° C. It is stated to be highly specific for fecal streptococci, growth in the medium and an acid reaction constituting almost complete evidence of the presence of *S. fecalis*. It will be recalled that Mallmann[4] suggested a similar medium for use at 37° C. for detection of the presence of streptococci; he used sodium azide in the proportion of 1:5,000.

In the further evaluation of the E C medium variable results were obtained by the eleven participating laboratories; one group of five reported that the E C medium at 37° C. gave results as good or slightly better than those yielded by lauryl sulfate tryptose broth,[5] but the reports from the other group of six laboratories were not so satisfactory. Similar variable results were obtained when using the medium for detection of *E. coli* with incubation at 45.5° C. They compared very favorably with the results secured from the use of these authors' modified Eijkman medium; but although five laboratories reported very few false gas-positives with either medium, the other six laboratories reported 16–17 per cent with both. The authors conclude that both the E C and the lauryl sulfate broth are highly efficient in the isolation of the coliform bacteria and that E C medium is somewhat more specific.

In an attempt to determine the value of this medium when used in the examination of Quebec waters, a series of 28 samples from a variety of sources was

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* Report of the Standard Methods Committee.

STANDARD METHODS COMMITTEE ON EXAMINATION OF WATER AND SEWAGE
Organized 1899. Reorganized 1933. Published reports: *Year Books* 1930–1931, 1934–1935, 1935–1936, 1937–1938, 1939–1940, 1941–1942, *A.J.P.H.*, May, 1943, Aug., 1944. 8 volumes published: 1905, 1912, 1917, 1920, 1923, 1925, 1933, 1936.

examined by Dr. J. Archambault in the laboratories directed by your referee, employing lactose broth, lauryl broth, and the E C medium. Of 195 lactose broth gas-positives, coliforms were isolated from 115; of 172 lauryl broth gas-positives, they were isolated from 129; and of 153 E C gas-positives, they were isolated from 111. In other words, lauryl sulfate broth yielded approximately 16 per cent more coliforms than did E C medium. As regards specificity, coliforms were isolated from 75 per cent of the lauryl sulfate broth and 72.5 per cent of the E C gas-positives. In the examination of this series of samples, therefore, although these two media appeared to possess practically the same specificity, lauryl sulfate broth proved to be somewhat the more sensitive.

Perry and Hajna suggest that small bubbles of gas in enrichment tubes be ignored because they may be due to air in the medium or to other accidental causes. Since it is feasible, with care, to eliminate such false positives, and since coliforms are frequently isolated from enrichment tubes showing small bubbles of gas, rejection of such tubes does not appear to be wholly warranted.

It will be interesting to know the experience of other observers who experiment with these two media.

There has been some criticism of the high cost of lauryl sulfate broth due to the increased concentration of peptone. A study was made by Mallmann and Gilmore [5] to determine the amount absolutely necessary to give maximum growth of coliforms. They found that there was little difference in the growth rates of coliform in 1.5 and 2 per cent concentrations of tryptose. The 2 per cent concentration gave the best results. One per cent concentrations were definitely inferior. The writers recommend that a 2 per cent concentration be used as previously recommended by Darby and Mallmann.[6]

Mallmann and Gilmore [5] also studied the stimulatory effect of 0.5 per cent concentration of sodium chloride in standard lactose broth. It was found that the addition of sodium chloride increased very materially the growth rates of coliforms. The growth rates attained were very much the same as those obtained with lauryl sulfate broth. Field studies should be made with a 0.5 per cent NaCl lactose peptone broth, in comparison to standard lactose broth. By the further addition of lauryl sulfate, it is possible that a very satisfactory medium would be available that would compare favorably with lauryl sulfate broth.

Gilcreas reports the need of a better method of determining grease in sewage analysis. He reports that methods for grease determination will be conducted during the coming year.

Several members of your committee are engaged in war work which has prevented them from active participation in work on standard methods in their respective fields.

W. L. MALLMANN, PH.D., *Chairman*, Michigan State College, East Lansing, Mich.
A. M. BUSWELL, PH.D.
F. WELLINGTON GILCREAS
MAC H. MCCRADY
M. STARR NICHOLS, PH.D.
THEODORE A. OLSON
LELAND W. PARR, PH.D.
JOHN T. TRIPP, PH.D.

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3. Perry, C. A. A Summary of Studies on Pollution in Shellfish—*Escherichia coli* versus the Coliform Group as an Index of Fecal Pollution and the Value of a Modified Eijkman Test. *Food Research*, 4:181, 1939.

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BOOKS AND REPORTS

All reviews are prepared on invitation. Unsolicited reviews cannot be accepted. All books reviewed in these columns may be purchased through the Book Service.

Manual of Tropical Medicine—*By Colonel Thomas T. Mackie, M.C., A.U.S., Major George W. Hunter, III, Sn.C., A.U.S., and Captain C. Brooke Worth, M.C., A.U.S. Philadelphia: Saunders,* 1945. 727 pp., 287 illus., 6 in color. Price, $6.00.

This manual produced with the collaboration of the staff of the Army Medical School is intended to provide a concise statement of the most recent available and authoritative information on tropical diseases. This has been accomplished in an excellent manner, and, although it cannot supplant larger textbooks, its wide scope, clear exposition, and excellent illustrations place it in the forefront of the one-volume texts in this field.

Sections of the book are devoted to diseases caused by all of the groups of infectious agents from viruses to helminths, and there are sections on nutritional diseases, arthropods and diagnostic methods. There are 18 original drawings of life cycles, protozoa, helminths, and arthropods; and excellent photographs and colored plates have been furnished by the Army Medical Museum, the National Institute of Health, the Army Medical School, and other individuals and publishers. Maps of geographical distribution have been furnished from the Army. There are also many tables of vectors and their distribution, summaries of disease transmission, and keys to the identification of parasites and vectors.

One cannot expect, however, that such a volume will be uniformly excellent. One of the weak spots is the treatment of amebiasis which the reviewer hopes will be improved in a later edition. There is also insufficient emphasis on the details of prevention of some diseases, particularly in view of the fact that the book is intended for use in military forces. The authors are to be congratulated upon a splendid accomplishment, particularly in view of their arduous responsibilities in training medical officers in tropical medicine. The publishers are also to be congratulated on an excellent product. This book should be in the hands of everyone concerned with tropical medicine, and can well be used as a textbook for medical students both in tropical medicine and parasitology.

HENRY E. MELENEY

Tropical Medicine—*By Sir Leonard Rogers, M.D., and Sir John W. D. Megaw. (5th ed.) Baltimore: Williams & Wilkins,* 1944. 518 pp. Illus. Price, $6.50.

This book has been written primarily for the general practitioner in the tropics who has available only the usual simple laboratory facilities. The laboratory methods used in diagnosis are given, and clinical diagnosis is stressed, and practical therapy most ably discussed from a large background of experience. The illustrations are not abundant and are of average quality. There are numerous maps showing the distribution of various diseases with their distribution in India especially stressed. The authors have purposely kept this volume small but in so doing have omitted discussion of infections by such important parasites as Ascaris, Clonorchis, Sarcoptes, and

others. The inherent value of this book so overwhelm these shortcomings, however, that it is still a very useful book not only for the general practitioner but also for military medical officers. H. W. BROWN

Doctors at War—*Edited by Morris Fishbein, M.D. New York: Dutton,* 1945. 418 pp. 82 illus. Price, $5.00.

This book is a record of heroism and accomplishment. It is authoritative and bears eloquent testimony to the work of the military medical services. Under the stress and dire needs of war, new methods and procedures, both in treatment and prevention, were accomplished in a remarkable manner, often in the face of extreme difficulties. The various theaters of operations were the testing grounds of medical science.

Without minimizing in the least any of the chapters of this extraordinary book, the chapter on "Preventive Medicine" stands as a monument of achievement. "Plasma," "penicillin," and "DDT" are already familiar terms whose implications are becoming more and more evident to everyone.

The book is well written and is all meat. It should be on the desk of every public health worker.

ANTHONY J. LANZA

The Attendant's Guide—*By Edith M. Stern in collaboration with Mary E. Corcoran. New York: Commonwealth Fund,* 1945. 104 pp. Price, $.50.

Like *Mental Illness: A Guide to the Family,* this little book by the same author and from the same publisher, is unique. It fills a need of such long standing that a widespread demand for it is a foregone conclusion.

Very simply and clearly, this "Guide" supplies information about the duties, attitudes, and knowledge expected of an attendant in a mental hospital. It is not a "procedure book" in any sense, but an authentically workable, readable, long needed explanation of the attendant's place in the care of mental patients. It dignifies that place and gives it rightful recognition.

Student and graduate nurses entering the mental hospital for the first time will be wise to read this little book, not only to gain understanding of the attendants' work, but because the "Guide" contains so much about the behavior of the mentally ill and the conditions surrounding their care, that they will be the better nurses for that knowledge.

The book marks a milestone on the road to much needed improvement in the attendant service for the mentally ill. DOROTHY DEMING

Vital Statistics Directory—*Compiled by the Vital Statistics Section of the A.P.H.A. (3rd ed.) New York: A.P.H.A.,* 1945. 33 pp. Price, $.75.

The Membership Committee of the Vital Statistics Section of the American Public Health Association, of which Dr. A. W. Hedrich is Chairman, has endeavored to include in this Directory "the names of all qualified persons active in the collection, publication, analysis or supervision of public health statistics." This has been a difficult undertaking and Dr. Hedrich, the Committee, and their assistants are to be commended on the successful completion of this *Directory.*

This *Directory* will be useful to members of the Section, to those concerned with several phases of the work of the Vital Statistics Section, and to administrators and others interested in vital statistics work.

Since the field of "qualified persons . . . in public health statistics" is difficult to define, this *Directory* has many types of workers. Professors, associate and assistant professors, statisticians, social science and public health analysts, public health representatives, registrars and deputy registrars, directors and

chiefs of divisions, actuaries, sanitarians, statistical and other clerks, and workers designated by numerous other titles are included.

The distribution of the 885 persons listed reveals an interesting situation. New York State (including New York City) had the largest number of persons employed at present, 162, with the District of Columbia second with 148. Six other states had 20 or more persons included: namely, California, 37; Illinois, 49; Michigan, 25, Minnesota, 20; New Jersey, 26; and Ohio, 34. Ten states, Connecticut, Kentucky, Maryland, Massachusetts, North Carolina, Pennsylvania, Tennessee, Texas, Virginia, and Wisconsin, had 10 to 19 persons listed. The remaining 31 states had less than 10 persons known to be active in the collection, publication, analysis or supervision of public health statistics. With the extension of public health work it is hoped that professional statistical workers will be available and will be used in all fields of public health and in all areas of the United States

RUTH R. PUFFER

Malaria in the Upper Mississippi Valley 1760–1900. *Supplement No. 4 to the Bulletin of the History of Medicine—By Erwin H. Acherknecht. Baltimore: Johns Hopkins Press,* 1945. 142 pp. Price $2.00.

This study deals particularly with the five states that lie partially in the Mississippi Valley above the mouth of the Missouri River, namely, Illinois, Missouri, Iowa, Wisconsin, and Minnesota. "The Upper Mississippi Valley was chosen for examination as a region where malaria, after having been once very prevalent, had disappeared spontaneously long before the introduction of any systematic antimalarial measures; and where, therefore, new insight into the mechanism of the rise and fall of malaria might be gained."

The monograph is characterized in the preface as "foremost an epidemiological study." It is much more than this, however. The author, with clear purpose, has combined the patient methods of historical research and documentation with clean-cut epidemiological reasoning and summarization; and with courage and imagination he interprets his material pro and con and states definite opinions even when they involve controversial points on which decisive data are not available.

The term "disappearance" designates a death rate of 1 or less per 10,000 population. Attempts to make the study quantitative as well as qualitative were largely defeated by the scarcity of morbidity or mortality data for that period. In addition to the well known reasons for incomplete reporting of malaria, "historians have the fatal tendency to write the history of doctors rather than the history of medicine and disease"; and malaria "was so common that by many it was no longer regarded as a disease at all and therefore, of course, not recorded as such"—"He ain't sick, he's only got the ager."

The results of the study cannot be summarized in a brief review. The introduction discusses the shortcomings of malaria records and early theories of the cause of malaria. The study is in two main parts. The first is a historical account, state by state, of "The Rise and Fall of Malaria in the Upper Mississippi Valley" and a review of the epidemiology of malaria in this region as compared to other parts of the United States. All useful sources that could be located are reviewed and cited, the information for each state is summarized and illustrated by charts, and the text is enlivened and clarified by numerous brief quotations.

The second part of the study is entitled "Possible Factors for the Disappearance of Malaria from the Upper Mississippi Valley." Of 12 factors examined none can be singled out as

the main or exclusive agent. Stopping of population movement, shifting of settlements inland (from the rivers), better housing, and increase in wealth seem to have acted in all five states. Cattle breeding appears to have had an enormous influence in Iowa, Wisconsin, and Minnesota. Only in Illinois and a limited area in Missouri did drainage, as an isolated factor, play a certain rôle. In a brief epilogue, the author argues that social factors—poverty, ignorance, and indolence—are sustaining causes rather than direct results of malaria prevalence; and that the incentive and resources for progress, as exemplified in this region, act indirectly but powerfully to subdue malaria and to promote regional development in spite of it.

Although primarily factual and not light reading, this book is extremely interesting and informative for anyone who reads it carefully. For those in general health work and for casual readers it gives a vivid and authentic picture of the scourge of malaria during colonization of these five northern states. For physicians, and others who are more directly concerned, its collection of authoritative opinions and about 235 selected references presenting both sides of fundamental questions should prove useful in work with or further study of malaria problems. Two minor disadvantages are lack of an index which impairs the value of the book as a reference text and its light paper cover which will not withstand frequent usage.

ROY J. MORTON

Science Year Book of 1945—*Edited by John D. Ratcliff. New York: Doubleday Doran,* 1945. 224 pp. Price, $2.50.

Science Today & Tomorrow—*By Waldemar Kaempffert. (2nd series) New York: Viking,* 1945. 279 pp. Price, $2.75.

Science in Progress—*Edited by George A. Baitsell. (4th series) New Haven, Conn.: Yale University Press,* 1945. 331 pp. illus. Price, $3.00.

We are told again and again that ours is the age of science. But what kind of science? Many persons believe in science today as they once believed in religion. Popular writers are teaming up science with "Magic," "Miracles," "Marvels," and even "Romance." They report on the "progress of science" as if there were no retrogression at all. The extent to which people believe in science is gratifying, but the picture they get of the scientific worker in movies, over the radio—not to mention the comic strip—is as far removed from reality as the sun is from the earth.

There are, of course, science writers who present a true picture. A well balanced selection of science stories from magazine publications has been made by John D. Ratcliff. A quarter of his *Science Year Book of 1945* deals with medicine. Most of the articles are taken from *Colliers.*

Waldemar Kaempffert deals mainly with the impact of science (and technology) on society, especially in relation to war. The chapter on "Sick medicine needs a doctor" will interest public health workers but it limits the discussion to the question of *how* and *how much* doctors should be paid.

Science in Progress is a series of reports made by the investigators themselves. They are not easy reading but are full of very interesting new approaches and findings. Walter R. Miles' Psychological Aspect of Military Aviation is especially recommended. Excellent photos illustrate the article on Structure and Action of Nerve Cells, by Detlev W. Bronk. Otto Loewi definitely terminates the old analogy of the nervous system and the telephone system in Chemical Transmission of Nerve Impulses.

Vitamins in mass production and vacuum chemistry go hand in hand.

K. C. D. Hickman's chapter on this subject is well illustrated and a masterpiece in the use of the King's English for describing understandingly such complicated matters as a "molecular still," and the pro—(and this is new) and postvitamines. We cannot forget his basic statement, "All human experience is complicated by the presence of air." *Science in Progress* is a selection of the Scientific Book Club, a very good one. BRUNO GEBHARD

A SELECTED PUBLIC HEALTH BIBLIOGRAPHY WITH ANNOTATIONS

RAYMOND S. PATTERSON, PH.D.

When Health Department Nurses Give Bedside Care—If, as the unnamed writers of this report predict, more and more health departments see the need of administering complete nursing programs including bedside care, then all of us should be interested in the eleven basic conditions listed and discussed.

AXON. Administration of Home Nursing Care of the Sick by Health Departments. Pub. Health Nurs. 37, 7:339 (June), 1945.

Interesting Negative Finding—From a study of parents of polio victims, *no* evidence is found to suggest that paralytic cases tend to occur among the offspring of parents lacking circulating antibodies against the infection.

ARMSTRONG, C., and DAVIS, D. J. Studies on Susceptibility to Poliomyelitis. Pub. Health Rep. 60, 25:710 (June 22), 1945.

Toward Better Schoolchild Health—How Detroit strives to stimulate the interest of practising physicians in the schoolchild's health, how children are induced to live as well as know the essentials of hygiene, and how school buildings are made healthful places are the burdens of this discussion.

BLANCHARD, V. S. School Health Problems. Canad. Pub. Health J. 36, 6:217 (June), 1945.

Is This a Novel Idea?—Or have I been dozing? A British researcher had toxoid made into pastiles and induced volunteers to suck four a day for seven days. Two weeks later, when they were bled, the circulating antitoxin was found definitely increased over the pre-treatment level. He does not propose the method for primary immunizations, but believes that it will prove useful for booster doses for adults who might have unpleasant reactions from the usual injections.

BOUSFIELD, G. Restoration of Diphtheria Immunity without Injections. Brit. M. J. 4406:833 (June 16), 1945.

Yeooh Spelled Backward—Transcripts of radio commercials about four groups of products: improvement of skin, hair, teeth; respiratory organs; digestive and excretory functions; and pain relief and general health. Opinions were asked of experts, teachers, graduate students, and laymen. A negative relationship between educational status and acceptance of radio advertising was reported—which can scarcely be wondered at.

DUNCAN, G. I., and LUND, F. H. The Validity of Health Information Gained through Radio Advertising. Research Quart. 16, 2:102 (May), 1945.

Organized Care for "Premies"—In addition to the usual considerations of feeding and keeping the premature baby clean and warm, this article discusses the psychological aspects of the relationship of mother and "premie." Others than nurses—for whom the paper

was prepared—could do with a little understanding of this subject.

DUNHAM, E. C. Progress in the Care of Premature Infants. Am. J. Nurs. 45, 7:515 (July), 1945.

Bowlegs and Knock-knees — Is severe rickets still a major worry to child hygienists? If so, they will be interested in this study of what happened to ten babies with marked rachitic deformities when the children had grown up.

DUNHAM, E. C., and THOMS, H. Effects of Severe Rickets in Early Childhood on Skeletal Development in the Adolescent. Am. J. Dis. Child. 69, 6:339 (June), 1945.

Dogs and Polio—In several epidemics the possibility of animal reservoirs for polio has been studied. In one, a related virus was recovered from a mouse caught in a house sheltering a case. Other natural occurrences of poliomyelitis-like viruses have been reported. Sera from 3 of 37 dogs taken during the Chicago epidemic in 1943 were found to neutralize virus, which indicates the possibility that "man's best friend" may be susceptible, too.

GORDON, F. B. The Neutralization of Poliomyelitis Virus by Dog Serums. J. Infect. Dis. 76, 3:198 (May–June), 1945.

Floating Streptococci in Hospital Wards—Triethylene glycol vapor, to be most effective in suppressing airborne pathogenic bacteria in hospital wards, should be accompanied by dust and lint control measures. Two papers.

HAMBURGER, M., JR., *et al.* The Effect of Triethylene Glycol Vapor on Air-Borne Beta Hemolytic Streptococci in Hospital Wards. J. Infect. Dis. 76, 3:208 (May–June), 1945.

It Pays to Remove Tonsils — Tonsillectomies are relatively rare in certain low-income farm families covered in a survey—only 5 per cent of white, and 3 per cent of colored children having been operated upon. Recommendations for the removal depend upon who does the inspecting and, apparently, the economic status of the inspectee.

GOVER, M., and YAUKEY, J. B. Physical Impairments of Members of Low-Income Farm Families—11,490 Persons in 2,477 Farm Security Administration Borrower Families 1940. Pub. Health Rep. 60, 25:693 (June 22), 1945.

Promise of Good Things to Come —What DDT sprayed on the walls did to 10,000 anopheline mosquitoes liberated in a test house shouldn't happen to a gnat! Oh for the day when the army releases the boon for the rest of us.

METCALF, R. L., *et al.* Observations on the Use of DDT for the Control of *Anopheles quadrimaculatus*. Pub. Health Rep. 60, 27:753 (July 6), 1945.

Who Wants Health Insurance? —Organized labor, say these writers, is the agency chiefly responsible for the growing call for compulsory health insurance, and the demand is most vocal in metropolitan centers. In New York and California, the wealthiest states with the greatest per capita supply of physicians, bills to create medical facilities are most numerous. In states, like Mississippi, where medical care is thinly spread, least is heard about provisions for it.

STROW, C. W., and HERSHFELD, G. Health Insurance. J.A.M.A. 128, 12:871 (July 21), 1945.

Are Our Sights Set Too High? —Surveys of "normal" Canadian diets indicate that with two exceptions—those of sedentary men and girls of 16–20—they are much lower in calories than the "Recommended Allowances."

VIRTUE, R., and MCHENRY, E. W. Comparison of Observed Intakes and Recommended Allowances of Calories. Canad. Pub. Health J. 36, 6:240 (June), 1945.

Athlete's Foot, et al.—One sentence, from a long conclusion to this paper should tell you whether or not

you will need to read it all. "Foot baths (hypochlorite and hyposulfite) are becoming discredited."

WEIDMAN, F. D., *et al.* The War and Dermatophytosis. J.A.M.A. 128, 11:805 (July 14), 1945.

City Life and TB—Among adult males, tuberculosis mortality increases directly with the size of the community, but among females the rate decreases. In rural areas there is only a slight difference between the sexes. There are other findings of this statistical analysis which shall not be spoiled for you by being quoted here.

YERUSHALMY, J., and SILVERMAN, C. Tuberculosis Mortality in Communities of Different Size. Am. Rev. Tuberc. 51, 5:413 (May), 1945.

BOOKS RECEIVED

Listing in this column acknowledges the receipt of books and our appreciation to the senders. Space and the interests of readers will permit review of some, but not all, of the books listed in future issues.

COMING HOME. New York: Metropolitan Life Insurance Co., 1945. 23 pp. Free from publisher, 1 Madison Ave., New York 10, N. Y.

HASOFE HAIVRI. The Hebrew Medical Journal. Volume 1, 1945. Edited by Moses Einhorn, M.D. New York: The Hebrew Medical Journal, 1945. 256 pp. Price, $1.60.

INJURY AND DEATH OF BACTERIA BY CHEMICAL AGENTS. By Otto Rahn. No. 3 of the Biodynamica Monographs. Normandy, Mo.: Biodynamica, 1945. 183 pp. Price, $3.60.

INTELLIGENCE AND ITS DEVIATIONS. By Mandel Sherman, M.D. New York: Ronald Press, 1945. 286 pp. Price, $3.75.

A MANUAL OF THE ASPERGILLI. By Charles Thom and Kenneth B. Raper. Baltimore: Williams & Wilkins, 1945. 373 pp. Price, $7.00.

THE MUNICIPAL YEAR BOOK, 1945. The authoritative resume of activities and statistical data of American cities. Editors, Clarence E. Ridley and Orin F. Nolting. Chicago: International City Managers' Association, 1945. 603 pp. Thumb indexed. Price, $8.50.

MY SAFETY AND FIRST AID-BOOK. By Leslie W. Irwin, Ph.D. New York: Lyons and Carnahan, 1945. 185 pp. Price, $.72.

PSYCHIATRY IN MODERN WARFARE. By Edward A. Strecker, M.D., and Kenneth E. Appel, M.D. New York: Macmillan, 1945. 88 pp. Price, $1.50.

POOR MAN'S DOCTOR. By Lewis R. Tryon, M.D. New York: Prentice-Hall, 1945. 233 pp. Price, $2.75.

PULMONARY TUBERCULOSIS IN THE ADULT. Its Fundamental Aspects. By Max Pinner, M.D. Springfield, Ill.: Thomas, 1945. 579 pp. Price, $7.50.

A RATIONAL EXAMINATION OF STREAM POLLUTION ABATEMENT. By Richard D. Hoak. Reprinted from *Science*, May 25, 1945. Pittsburgh: Mellon Institute of Industrial Research, 1945. 8 pp. Free from publisher, University of Pittsburgh, Pittsburgh 13, Pa.

SCIENTIFIC SOCIETIES IN THE UNITED STATES. By Ralph S. Bates, Ph.D. New York: Wiley, 1945. 246 pp. Price, $3.50.

SCIENCE. THE ENDLESS FRONTIER. A Report to the President by Vannevar Bush. Washington, D. C.: Government Printing Office, 1945. 184 pp.

SOLVING CAMP BEHAVIOR PROBLEMS. Individual Guidance in Group Work. By J. Kenneth Doherty. New York: Association Press, 1944. 62 pp. Price, $.50.

WAR RESEARCH AT MELLON INSTITUTE, 1944–5. Reprinted from Science, May 18, 1945. Pittsburgh: Mellon Institute of Industrial Research, 1945. 8 pp. Free from publisher, University of Pittsburgh, Pittsburgh 13, Pa.

ASSOCIATION NEWS

STATE PUBLIC HEALTH MEETINGS: 1945 PATTERN

As announced in the May issue of the *American Journal of Public Health* (page 536) a series of state health meetings under the auspices of state public health associations was arranged in several of the central and mountain states during May and early June, and was attended by a team of speakers organized under the auspices of the American Public Health Association. This circuit followed to a considerable extent the pattern of 1943 and 1944 for wartime meetings and had been approved by the Executive Board of the Association to meet the manifest need for professional refresher courses as requested by these states.

Even under the strict limitations of the orders of the ODT it was possible to hold 9 very successful meetings. The circuit began May 16 in Chicago, and was followed by a meeting in Springfield, Ill., both under the auspices of the Illinois Public Health Association. Two meetings under the auspices of the Missouri Public Health Association were held in St. Louis and in Kansas City, and two under the auspices of the Kansas Public Health Association in Topeka and Wichita.

The team of speakers, supplementing those from the states concerned, included at these first six meetings James G. Townsend, M.D., Director of the Industrial Hygiene Division, National Institute of Health, Bethesda, Md.; George M. Wheatley, M.D., Assistant Vice President, Welfare, Metropolitan Life Insurance Company, New York; Frank Stafford, M.A., of the U. S. Office of Education, Washington, D. C.; Ruth Fisher, R.N., Associate Director, National Organization for Public Health Nursing, New York; and Reginald M. Atwater, M.D., Executive Secretary, A.P.H.A.

The meetings organized in Denver, Salt Lake City and Boise, Ida., under the auspices of the respective state public health associations, were longer sessions, one in each state. These were attended by Dr. Townsend, Dr. Wheatley and Dr. Atwater and, in addition, by Karl F. Meyer, M.D., the Director of the Hooper Foundation, University of California, San Francisco, who is President of the Western Branch, A.P.H.A.; and by Fred T. Foard, M.D., District Director, U. S. Public Health Service, Denver; and Ruth Freeman, R.N., Director of the Course in Public Health Nursing, University of Minnesota, Minneapolis. Other speakers, including Thomas Parran, M.D., Surgeon General of the U. S. Public Health Service, attended some of these meetings, together with other representatives of the federal services, among them Edith P. Sappington, M.D., Regional Director of the U. S. Children's Bureau, San Francisco.

In spite of the limitation on travel from a distance, it was possible by arranging these meetings according to this schedule to bring the programs before an audience totaling more than 2,100 persons. The opinion was repeatedly expressed by officers of the state public health associations that this method had values in it for the future, since a very large proportion of those who were able to attend these refresher courses would be unable, even in peacetime, to get to a single large meeting either of the Western Branch or of the Association itself. It was the opinion, however, of various state associations affiliated under the Western Branch that

the Branch organization itself should continue and that Branch meetings should be held again as soon as possible after the war. Appreciation was expressed to the officers of the Western Branch who have made a financial contribution in order to finance the travel of some of the speakers.

APPLICANTS FOR MEMBERSHIP

The following individuals have applied for membership in the Association. They have requested affiliation with the sections indicated.

Health Officers

Gastao Cesar de Andrade, M.D., M.P.H., Caixa Postal 1530, Rio de Janeiro, Brazil, S. A., formerly Asst. to Director, Servico Especial de Saude Publica

H. V. Gibson, M.D., Civil Center, Great Falls, Mont., Director, Cascade County Health Unit

Max R. Kiesselbach, M.D., M.P.H., 638 Phelan Bldg., 760 Market St., San Francisco 2, Calif., Asst. to the Chief, Bureau of Venereal Diseases, State Dept. of Public Health

Ernest S. Kinsey, M.D., M.P.H., 709 Press Bldg., Binghamton, N. Y., Asst. District State Health Officer, State Dept. of Health

Michel E. Royere, M.D., American Sanitary Mission, Port-au-Prince, Haiti, W. I., Physician

Frank A. Witt, 346 State St., Hackensack, N. J., Health Officer

James T. Worrell, M.D., 17 W. 4th St., La Junta, Colo., Asst. Surgeon (R), U. S. Public Health Service; Director, Otero County Health Dept.

Laboratory Section

Capt. Edward Gallardo, M.C., Station Hospital, Camp Croft, S. C., Medical Inspector

Harry I. Gilman, Huntsville Arsenal, c/o Eng. Serv., Alabama, Toxicologist

Walter H. Oglesby, P. O. Box 1121, Clovis, N. M., Chief Medical Technician, Oglesby's Clinical Laboratory

Otto Rahn, Ph.D., Dairy Bldg., Cornell Univ., Ithaca, N. Y., Prof. of Bacteriology

Engineering Section

Lester E. Blaschke, U. S. P. H. S. Dist No. 1, 15 Pine St., New York, N. Y., Asst. Sanitary Engineer (R), U. S. Public Health Service

Lt. William Hendrix, 1004 City Hall, Houston 2, Tex., Asst. Sanitarian (R), U. S. Public Health Service; Supervisor of General Sanitation in Houston

Lance H. Hoop, P. O. Box 6884, Stockyards Station, Denver 16, Colo., President, Western Filter Co.

Major Leonard H. Male, 707 Pere Marquette Bldg., New Orleans, La., Sanitary Engineer (R), U. S. Public Health Service

T/S Charles H. Niggeman, Laboratory Technician, General Hospital

Professor Donald E. Stearns, College of Applied Science, Syracuse Univ., Syracuse 10, N. Y., Prof. of Civil Engineering and Chairman, Dept. of Civil Engineering

Roy J. Wasmund, Weld County Health Dept., Greeley, Colo., Sanitarian

Food and Nutrition Section

Amanda C. Tucker, M.A., 519 Dexter Ave., Montgomery 4, Ala., Senior Nutritionist, State Board of Health

Public Health Education Section

Miriam M. Campbell, State Bureau of Health, Augusta, Me., Director of Public Health Education

Ruth E. Christiansen, R.N., Franklin County Tuberculosis Hospital, Columbus 7, O., Acting Director of Nursing Service

Irene Ann Fahey, M.P.H., 1425 Fargo Ave., Chicago 26, Ill., Health Education Representative, State Dept. of Health

Alice H. Sanders, M.A., R.N., 90 W. Central, Delaware, O., Health Educator, Metropolitan Health Council, Columbus, O.

Jay E. Thompson, 303 Superior St., Toledo 4, O., Exec. Secy., Toledo Public Health Assn.

Dr. Alamiro Valdes-Herrera, Casilla 111, La Serena, Coquimbo, Chile, S. A., Jefe, Sanitario Provincial, Servicio Nacional de Salubridad

Public Health Nursing Section

Minnie B. Engelberg, R.N., 14 Sunnyside Ave., Charleston, S. C., Staff Nurse, Charleston County Health Dept.

Esther Kaufman, City Health Dept., Sioux Falls, S. D., Public Health Nurse, U. S. Public Health Service

Una E. Robertson, R.N., Napoleonville, La., Regional Advisory Nurse, State Dept. of Health

Mary L. Stockbrand, 1209 W. 22½ St., Austin,

Tex., Tuberculosis Nursing Consultant, State Dept. of Health

Epidemiology Section

Arthur E. Dreuth, 309 "C" St., Marysville, Calif., Venereal Disease Investigator, Bureau of Venereal Diseases, State Dept. of Public Health

Rodolfo A. Gavidia, M.D., Libertad 735, Magdalena del Mar, Lima, Peru, S. A., Consultant in the Inter-American Health Service

Norman Kramer, Director of Laboratory, Epidemiology Unit

Arnold B Kurlander, M.D., State Dept. of Health, Phoenix, Ariz., Director, Div. of Tuberculosis Control; P. A. Surgeon, U. S. Public Health Service

School Health Section

Verne S. Landreth, A.M., 311 California State Bldg., Los Angeles 12, Calif., Chief, Division of Physical and Health Education, State Dept. of Education

Jose de la Fuente Riveroll, M.D., Obregon No. 90, Hermosillo, Sonoro, Mexico, School Doctor, State Educational Board

John H. Shaw, Ed.D., Dept. of Athletics and Physical Education, Syracuse Univ., Syracuse, N. Y., In charge of Teacher Training, Division of Teacher Education

Henry W. Vollmer, M.D., 1531 E. Wilson Ave., Glendale 6, Calif., Dept. of Health Education, Pacific Union Conference of the Seventh Day Adventists

Unaffiliated

John P. Berger, M.D., 509 Brown Bldg., Wichita 2, Kan., Syphilologist

Harold B. Gursha, 218 Foster St., Brighton, Mass., Veterinary Student, Middlesex Univ.

I. D. Richardson, Evadale, Tex., Sanitation Officer, U. S. Navy

Anthony J. J. Rourke, M.D., 2235 Laguna St., San Francisco 15, Calif., Assoc. Prof. of Hospital Administration, and Medical Director, Stanford Univ., Medical School

APPLICANTS FOR FELLOWSHIP

In accordance with the By-laws of the Association, the names of applicants for Fellowship are officially published herewith. They have requested affiliation with the Sections indicated. Action by the various Section Councils, the Committee on Eligibility, and the Governing Council will take place during the next two months.

Health Officers Section

George H. Becker, M.D., Director, Bureau of Communicable Diseases, San Francisco Department of Public Health, San Francisco, Calif.

Millard B. Bethel, M.D., M.P.H., Health Officer, Cabarrus County Health Department, Concord, N. C.

Philip E. Blackerby, M.D., State Health Commissioner, Louisville, Ky.

George F. Campana, M.D., M.P.H., State Health Officer, Bismarck, N. D.

F. R. Nicholas Carter, M.D., Health Officer and Secretary, Board of Health, South Bend, Ind.

Albert C. Edwards, M.D., M.P.H., Director, St. Clair County Health Dept., Port Huron, Mich.

Floyd M. Feldman, M.D., Dr.P.H., Health Officer, Rochester City Health Dept., Rochester, Minn.

Henry A. Holle, M.D., Surgeon, U. S. Public Health Service, Washington, D. C. (on UNRRA assignment abroad)

Roscoe P. Kandle, M.D., M.P.H., Director, Division of Local Health Service, State Board of Health, New Orleans, La.

Jacob H. Landes, M.D., M.P.H., Senior Health Officer, Department of Health, New York, N. Y.

Frederick D. Mott, M.D., C.M., Chief Medical Officer, Farm Security Administration, Washington, D. C.

Frederick A. Musacchio; M.D., M.S.P.H., Director, Laredo-Webb County Health Unit, Laredo, Tex.

Emil A. Palmquist, M.D., M.P.H., City Health Commissioner, Seattle, Wash.

Angelo M. Perri, M.D., M.P.H., Chief of Communicable Disease Division, Department of Public Health, Philadelphia, Pa.

William A. Powell, M.D., Contra Costa County Health Officer, Martinez, Calif.

C. L. Putnam, M.D., M.S.P.H., Deputy Commissioner and Director of Local Health Services, State Department of Health, Des Moines, Iowa

Arthur L. Ringle, M.D., C.P.H., Director, State Department of Health, Seattle, Wash.

Mason Romaine, M.D., M.P.H., Health Officer, Petersburg, Va.

Roy M. Seideman, M.D., Dr.P.H., Industrial Hygiene Physician, State Department of Health, Hartford, Conn.

Ellis D. Sox, M.D., C.P.H., Chief, Division

of Local Health Service, State Department of Public Health, San Francisco, Calif.

Major General Morrison C. Stayer, M.C., Chief Surgeon, North African-Mediterranean Theater of Operations, U. S. Army (overseas address)

James L. Troupin, M.D., M.S.P.H., District Health Officer, Health Department, New York, N. Y.

I. Oscar Weissman, M.D., M.P.H., Surgeon (R), U. S. Public Health Service; Director, Muskogee City-County Health Dept., Muskogee, Okla.

Maurice S. Whiteside, M.D., Health Officer, Cullman County Health Dept., Cullman, Ala.

John M. Whitney, M.D., Superintendent of Health, New Orleans, La.

Charles L. Wilbar, Jr., M.D., President, Territorial Board of Health, Honolulu, T. H.

Ralph C. Williams, M.D., Assistant Surgeon General and Chief, Bureau of Medical Services, U. S. Public Health Service, Washington, D. C.

Laboratory Section

Claude S. Bryan, D.V.M., Ph.D., Professor and Head, Department of Surgery and Medicine, Michigan State College, East Lansing, Mich.

Irma L. Comstock, B.S., Principal Biologist, State Board of Health Laboratory, Jefferson City, Mo.

Harald N. Johnson, M.D., Member of Staff and Director of Rabies Study, International Health Division, Rockefeller Foundation, Montgomery, Ala.

Einar Leifson, Ph.D., Professor of Bacteriology, University of South Dakota, Vermillion, S. D.

Benjamin S. Levine, Ph.D., Director, Division of Laboratories, State Board of Health, Pierre, S. D.

Robert P. Myers, Ph.D., Chief Bacteriologist, Research Laboratory, National Dairy Products Corp., Baltimore, Md.

Wade W. Oliver, M.D., Professor of Bacteriology, Long Island College of Medicine, Brooklyn, N. Y.

Clarence C. Ruchhoft, B.S. in Ch.E., Principal Chemist, U. S. Public Health Service, Cincinnati, Ohio

Roy Schneiter, Ph.D., Bacteriologist in Charge, Bacteriological Section, Industrial Hygiene Research Laboratory, National Institute of Health, Bethesda, Md.

Lt. Comdr. Frank H. Stubbs, USN, Executive Officer, Duke University N.R.O.T.C., (formerly Director, Branch Laboratory, Georgia State Health Dept.), Albany, Ga.

A. Elizabeth Verder, Ph.D., Bacteriologist, National Institute of Health, Bethesda, Md.

Vital Statistics Section

Marta Fraenkel, M.D., Medical Advisor, Bureau of Research and Statistics, Social Security Board, Washington, D. C.

Marjorie E. Gooch, Sc.D., Chief, Health Statistics Section, Division of Statistical Research, Children's Bureau, Washington, D. C.

Iwao M. Moriyama, Ph.D., C.P.H., Senior Social Science Analyst, Bureau of the Census, Washington, D. C.

Marcelino Pascua-Martinez, M.D., Associate Professor, Johns Hopkins School of Hygiene and Public Health, Baltimore, Md.

Elliott H. Pennell, B.S., Senior Statistician, U. S. Public Health Service, Bethesda, Md.

Engineering Section

Col. William A. Hardenbergh, Sn.C., Director, Sanitary Engineering Division, Surgeon General's Office, U. S. Army, Washington, D. C.

Arthur H. Herberger, C.E., M.S., Director, Division of Sanitation, Nassau County Department of Health, Mineola, N. Y.

Industrial Hygiene Section

August Baier, M.D., Medical Director, Des Moines Ordnance Plant, U. S. Rubber Co., Des Moines, Iowa

Edgar C. Barnes, B.S., Industrial Hygiene Engineer, Westinghouse Electric Corporation, East Pittsburgh, Pa.

Rodney R. Beard, M.D., M.P.H., Assistant Professor of Public Health and Preventive Medicine, Stanford Medical School, San Francisco, Calif.

Harold T. Castberg, M.D., Chief, Bureau of Adult Health, State Department of Public Health, Berkeley, Calif.

Walter E. Doyle, M.D., Chief, Medical Unit, Industrial Hygiene Division, U. S. Public Health Service, Washington, D. C.

John W. Dugger, M.D., Director, Division of Industrial Hygiene and Factory Inspection, State Board of Health, Jackson, Miss.

Anna M. Fillmore, R.N., M.P.H., Industrial Nursing Consultant, Visiting Nurse Service of New York, New York, N. Y.

Donald O. Hamblin, M.D., Medical Director, American Cyanamid Co., New York, N. Y.

Clifford Kuh, M.D., Dr.P.H., Director of Public Health, Permanente Foundation Hospital, Oakland, Calif.

Hedwig S. Kuhn, M.D., Ophthalmologist; Member, Industrial Vision Institute, Purdue University; Secretary, Joint Committee of

Industrial Ophthalmology, American Medical Association and American Academy of Ophthalmology, Hammond, Ind.

Melville H. Manson, M.D., F.A.C.S., Medical Director, American Telephone and Telegraph Co., New York, N. Y.

John M. McDonald, M.D., D.P.H., Director, Bureau of Occupational Diseases, City Health Department, Baltimore, Md.

Clarence W. Muehlberger, Ph.D., Toxicologist, State Department of Health, Lansing, Mich.

Samuel M. Peck, M.D., Special Consultant on Dermatology and Medical Director (R), U. S. Public Health Service, New York, N. Y.

Crit Pharris, M.D., M.P.H., Assistant Medical Director, United Aircraft Corp., East Hartford, Conn.

John J. Prendergast, M.D., Medical Director, Chrysler Corporation, Detroit, Mich.

Mark M. Schapiro, M.D., Medical Examiner, Manhattan Life Insurance Company and Metropolitan Life Insurance Co., Chicago, Ill.

George H. Zerbst, M.D., Director, Division of Industrial Health, State Board of Health, Columbia, S. C.

Food and Nutrition Section

Anna de Planter Bowes, M.A., Chief, Division of Nutrition, Bureau of Maternal and Child Health, State Department of Health, Harrisburg, Pa.

Frank L. Gunderson, Ph.D., Director of Nutrition, the Quaker Oats Co., and Executive Secretary, Food and Nutrition Board, National Research Council, Washington, D. C.

Icie Macy Hoobler, Ph.D., Director, Research Laboratory, Children's Fund of Michigan, Detroit, Mich.

C. Frances MacKinnon, M.S., Consultant in Nutrition, Unit for Inter-American Cooperation, Children's Bureau, Washington, D. C.

Elsa Orent-Keiles, Sc.D., Principal Nutrition Chemist in Charge of Nutrition Investigations, U. S. Department of Agriculture, Washington, D. C.

Telford W. Workman, D.V.M., Ph.D., Production and Technical Director, Northeast District, The Borden Co., Bridgeport, Conn.

Maternal and Child Health Section

Samuel R. Berenberg, M.D., Chief, Child Health Services, Health Department, New York, N. Y.

Lt. Comdr. Tipton M. Jolliffe (MC), U.S.N.R., Medical Officer of Health, Epidemiology Unit No. 21, N.A.T.B., Corpus Christie, Tex.

Viktor O. Wilson, M.D., M.P.H., Director, Division of Child Hygiene, State Department of Health, Minneapolis, Minn.

Public Health Education Section

Theron H. Butterworth, Ph.D., Associate Milk Specialist, U. S. Public Health Service (at present on leave of absence to complete a year of graduate study in Health Education), Chapel Hill, N. C.

Donald A. Dukelow, M.D., Director of Public Health Education, State Department of Health, Minneapolis, Minn.

Eleanor Hassell, M.P.H., Assistant Director of Health Education, State Board of Health, Jackson, Miss.

Ann W. Haynes, M.P.H., Acting Chief, Bureau of Health Education, State Department of Public Health, San Francisco, Calif.

Jean Henderson, Chief, Public Relations and Recruitment, Cadet Nurse Corps, U. S. Public Health Service, Washington, D. C.

Raymond U. Hilleman, M.A., Health Education Secretary, Ohio Public Health Association, Columbus, Ohio

Rosemary M. Kent, M.A., Health Consultant, City Public Schools, Winston-Salem, N. C.

Adelaide R. Ross, M.Ed., Associate in Health Education, National Tuberculosis Association, New York, N. Y.

Alice L. Spillane, M.P.H., Chief, Division of Health Education, State Department of Health, Seattle, Wash.

Public Health Nursing Section

Ruth Albrecht, R.N., B.S., (formerly Assistant Director, Division of Public Health Nursing, Texas State Department of Health), at present working toward M.A. at University of Chicago, Chicago, Ill.

Adaline Chase, R.N., M.A., Assistant Professor, Department of Nursing Education, School of Education, University of Pennsylvania, Philadelphia, Pa.

Beatrice M. Clutch, R.N., M.A., Acting Director, Nursing Education Division, George Peabody College, Nashville, Tenn.

Pearl P. Coulter, R.N., M.S., Associate Professor of Public Health Nursing, University of Colorado, Boulder, Colo.

Judith A. Davies, M.S., R.N., Director of Public Health Nursing, Santa Barbara County Health Department, Santa Barbara, Calif.

Norma B. Eskil, B.S., R.N., Director of Public Health Nursing, Health Department, Flint, Mich.

Ella M. Hott, R.N., M.A., Director, Division of Public Health Nursing, State Board of Health, Jefferson City, Mo.

Janet Jennings, R.N., M.A., Educational Director, State Department of Public Health, Springfield, Ill.

Marie L. Johnson, R.N., B.S., Assistant Director, Nursing Bureau, Metropolitan Life Insurance Co., New York, N. Y.

Winifred M. Kellogg, B.S., R.N., Educational Director, Visiting Nurse Association, Detroit, Mich.

Esther M. Latimer, R.N., M.P.H., Assistant Professor of Nursing, School of Nursing, University of Michigan, Ann Arbor, Mich.

Amy A. MacOwan, R.N., M.A., Assistant Professor of Public Health Nursing, School of Nursing, University of California, Berkeley, Calif.

Ida McRoberts, R.N., M.A., Director of Public Health Nursing, Cattaraugus County Department of Health, Olean, N. Y.

Ann S. Nyquist, R.N., Acting Director of Public Health Nursing, State Department of Health, Minneapolis, Minn.

Irma E. Reeve, R.N., M.A., Associate Director, New Haven Visiting Nurse Association, New Haven, Conn.

Elizabeth L. Sewell, R.N., M.A., District Supervising Nurse, State Department of Health, New York, N. Y.

Pearl Shalit, R.N., M.S., Executive Director, St. Paul Family Nursing Service, St. Paul, Minn.

Margaret S. Taylor, R.N., M.A., Public Health Nursing Consultant, Tuberculosis Control Division, U. S. Public Health Service, Washington, D. C.

Grace L. Unzicker, R.N., B.S., Senior Assistant Nurse Officer (R), Tuberculosis Control Division, U. S. Public Health Service, Washington, D. C.

Epidemiology Section

Major Claude M. Eberhart, M.C., Chief, Division of Preventive Medicine, Headquarters United Kingdom Base (address overseas)

William W. Frye, M.D., Ph.D., Professor of Preventive Medicine and Public Health, Vanderbilt University School of Medicine, Nashville, Tenn.

John R. Paul, M.D., Professor of Preventive Medicine, Yale University Medical School, New Haven, Conn.

Walter B. Quisenberry, M.D., M.P.H., Venereal Disease Control Officer, State Health Department, Lincoln, Nebr.

Erich Seligmann, M.D., Chief Bacteriologist, Beth Israel Hospital, New York, N. Y.

I. Jackson Tartakow, M.D., M.S.P.H., Epidemiologist, Nassau County Department of Health, Mineola, N. Y.

School Health Section

Robert M. Robbins, M.B., Ch.B., Surgeon (R), U. S. Public Health Service; Assistant Commissioner of Health, Macon, Ga.

Benjamin Sachs, M.D., M.S.P.H., Director, Bureau of Maternal and Child Hygiene, City Board of Health, Hartford, Conn.

Sue H. Thompson, M.D., M.P.H., Commissioner of Health, Columbia County Health Department, Hudson, N. Y.

Dental Health Section

A. Laurence Corbman, D.D.S., Field Public Health Dentist, U. S. Department of Interior, Ann Arbor, Mich.

Linwood G. Grace, D.D.S., Chief, Dental Division, State Department of Health, Harrisburg, Pa.

Joseph J. Obst, D.D.S., In Private Dental Practice; Editor, Journal of Second District Dental Society, State of New York, Brooklyn, N. Y.

Unaffiliated

Matthew H. Griswold, M.D., Dr.P.H., Chief, Division of Cancer Research, State Department of Health, Hartford, Conn.

Major M. J. Plishner, Sn.C., Medical Department Equipment Laboratory, Carlisle Barracks, Pa.

Herbert Ratner, M.D., Director of Student Health, and Associate, Department of Preventive Medicine, Public Health and Bacteriology, Loyola Univ., Chicago, Ill.

Srish Chandra Seal, M.B., D.P.H., Assistant Professor of Epidemiology and Vital Statistics, All-India Institute of Hygiene and Public Health, Calcutta, India

Richard G. Soutar, M.D., Director, Department of Health and Development, City Unified School District, Sacramento, Calif.

Paul H. Stevenson, M.D., Dr.P.H., Senior Surgeon, Division of Mental Hygiene, U. S. Public Health Service, Washington, D. C.

Major James M. Suter, M.C., 4th Military Government Group, 5th Provisional Battalion, Civil Affairs Staging Area, Monterey, Calif.

John W. Williams, M.D., Surgeon, U. S. Public Health Service, U. S. Marine Hospital, Detroit, Mich.

EMPLOYMENT SERVICE

The Association Employment Service seeks to bring to the attention of appointing officers the names of qualified public health personnel and to act as a clearinghouse on employment. This is a service of the Association conducted without expense to the employer or employee.

From the registry of persons available, selected announcements are published from time to time. Appointing officers may obtain lists of all registrants on request.

Address all correspondence to the Employment Service, American Public Health Association, 1790 Broadway, New York 19, N. Y.

Positions Available

(Supplemental to lists in recent Journals)

Wanted: Two engineers for Industrial Hygiene Service of Tennessee. Four different starting salaries between $2,364 and $3,900 depending on training and experience. Car furnished. Positions permanent. Opportunity for advancement. Apply Dr. R. H. Hutchinson, Commissioner of Health, Nashville 3, Tenn.

Wanted: Physician, Division of Child Hygiene, Ohio Dept. of Health. Salary $4,200. Must be graduate of approved medical school, have 1 year's internship and at least 1 year graduate training, plus 1 year of training or experience in clinical pediatrics or obstetrics. Experience in maternal and child health desirable. Must be licensed in Ohio or eligible for licensure. Apply Chief of Division of Child Hygiene, Dept. of Health, State Departments Bldg., Columbus 15, Ohio.

Positions open: District and County Health Officers in Florida. Medical degree required. Write or wire Merit System Supervisor, State Board of Health, Gainesville, Fla., for complete information.

Physician wanted: Public health pediatrics and epidemiology in large California County Health Department. Major duties consist of infant and preschool health conferences, school examinations, and epidemiology. Beginning salary $455 per month, plus travel allowance, and one meal a day. California license required. Training, experience in pediatrics or public health desirable. Immediately available. Apply William C. Buss, M.D., Kern Co. Health Dept., Bakersfield, Calif.

Bureau of Tuberculosis, Board of Health, Territory of Hawaii, seeks Biometrician or Statistician. Position will probably be classified under Territorial Civil Service as CAF-8 with salary of $244.59 plus wartime bonus of $50 and yearly increment of about $192 up to 5 years. Bureau of Tuberculosis is also looking for young physician experienced in tuberculosis work to have immediate charge of active case finding survey program now under way. This position classified under Territorial Civil Service as P-5 with salary of $416.67 plus $50 wartime bonus and yearly increment of about $250 up to 5 years. Apply Robert H. Marks, M.D., Director, Bureau of Tuberculosis, Territorial Board of Health, Honolulu, T.H.

Wanted: Bacteriologist with B.S. or M.S. degree, preferably male, to teach student nurses, 45 hour course twice a year, to assist with teaching of second year medical students and do general laboratory work. Salary $2,000 with option of complete maintenance for $25 per month. Apply Dr. R. J. Schenken, Director, Dept. of Pathology and Bacteriology, Louisiana State University School of Medicine, New Orleans 13, La.

Wanted: Physician to assume directorship, Bureau of Venereal Diseases, in eastern city of 185,000 population. Permanent position. Minimum salary $4,657, maximum $5,197.37, includes cost of living adjustment. Travel allowance. Apply **Box J,** Employment Service, A.P.H.A.

Maternal and Child Health Services director for city health department in California, city of 100,000 population. Pediatrician or public health trained physician to administer program, serve as clinician in child health conferences and supervise nursery school health program. Salary up to $6,300 per annum, plus travel. Send complete details and photograph to **Box I,** Employment Service, A.P.H.A.

Excellent opportunities, permanent tenure, for doctors, dentists, nurses, technicians with the Oregon State Board of Health in specialized fields. For information write Merit System Council, 616 Mead Bldg., Portland 4, Ore.

Wanted: Immediately: Veterinarian for Columbia County Department of Health. Salary—maximum $3,600 per year plus automobile and up-keep. Veterinarian must be licensed in New York State. Address Dr. Sue H. Thompson, 612 Warren Street, Hudson, N. Y. Position for the duration of the war.

Wanted: Sanitarian and dairy inspector for field work. Salary $2,400 per year plus $5 per day for living expenses. Auto with gasoline and all other expenses furnished. Apply E. J. Ward, Commissioner of Agriculture, State Dept. of Agriculture, Cheyenne, Wyo.

Wanted: Public health officer in well established health department in county of 68,000 population. Salary $5,500. Apply Floyd O. Prunty, Chairman, Marion Co. Lay Health Committee, 300 Second St., Fairmont, W. Va.

Executive Secretary Wanted. Applicant must have some specialized training and experience in health education. Executive experience desirable. Salary $3,000 up, depending upon qualifications. Car furnished. Apply with full information to A. C. Martin, M.D., Nassau Co. Cancer Committee, 1551 Franklin Ave., Mineola, N. Y.

Wanted: Experienced graduate bacteriologist. Take complete charge of local health department laboratory. Civil service protection, tenure and pension. Starting salary $1,980 per annum. Apply Health Department, P. O. Box 786, Plainfield, N. J.

Wanted: Experienced sanitarian for state dairy and restaurant inspection. Salary $2,400 a year, plus $5 per day expenses. Car furnished with gasoline and other expenses paid. Apply Dr. G. M. Anderson, State Board of Health, Capitol Building, Cheyenne, Wyo.

City of Jackson, Mich., Civil Service Board will accept immediate applications for position of public health nurse in city health department. Must be graduate of high school and school of nursing of recognized standing with special training in public health nursing; registration in Michigan; some experience in public health nursing, preferably with certificate in public health nursing and some knowledge of advanced public health and social service practice. Salary $2,000 per year. Applications may be obtained from Civil Service Board, 4th Floor, City Hall, Jackson, Mich.

Wanted: Public Health Nurses, Knoxville Area. Generalized nursing service in new and growing health department with unusual opportunities. Starting salary $2,500 per year or higher, depending on qualifications. Opportunity for advancement. Apply Health Officer, Oak Ridge Dept. of Health, P. O. Box 486, Oak Ridge, Tenn.

Two positions open in Sanitation Section, Div. of Health, City of St. Louis: Public Health Engineer II, salary $210 to $285 per month. Work consists of making surveys and studies of industrial plants, to determine nature and magnitude of industrial hygiene problems; making quantitative studies of plant environment, etc., checking protective equipment for effectiveness and make recommendations for further control measures. Study of ventilation, illumination, and sanitation of workroom. Desirable qualifications include graduation from recognized school of engineering and some experience or graduate training in industrial hygiene or public health engineering. Public Health Engineer I, salary range $170 to $220 per month. Engineering investigation of environmental problems and conditions, etc. Desirable qualifications include graduation from recognized school of engineering. No experience necessary. Applications may be made to Personnel Dept., Room 235, Municipal Courts Bldg., St. Louis 3, Mo.

Wanted: Bacteriologist, preferably with experience in preparation of antigens, with knowledge of animal immunization and some research experience. Excellent opportunities for advancement. Location, East. Write, giving age, education, experience and salary requirements. **Box F**, Employment Service, A.P.H.A.

The following positions are available in Michigan:

Hospital Physician, III, $287 to $356
Hospital Physician, IV, $373 to $442
Hospital Physician, V, $460 to $575
Sanatorium Physician, V, $460 to $575
Psychiatrist Va, $506 to $616
Director of a Children's Center
Physician IV, $340 to $420
Head of Medical Department, Michigan State Reformatory
Pathologist V, $460 to $575
Tuberculosis Sanatorium
Medical Coordinator V, $440 to $550
Assistant in Crippled Children Commission

Apply to Michigan State Civil Service Commission, 220 No. Grand Avenue, Lansing, Mich.

Position of Medical Director, Crippled Children's Program, Arkansas, open. Salary $4,600, travel expense extra and actual expense of lodging up to $2.05 a day for meals and 5¢ a mile for travel. Minimum qualifications are 2 years

pediatric residency, 1 year general rotating internship or pediatric internship, 1 year experience in public health or practice of pediatrics or general practice, the greater per cent of which is pediatrics. Salary of $4,800 to start for applicant with higher qualifications. Prefer someone familiar with Arkansas if possible. Write Commissioner, Dept. Public Welfare, Little Rock, Ark.

Wanted: Physician for position of Chief, Bureau of Tuberculosis in California State Dept. of Public Health. Major duties consist of general administration, through local health units, of state and federal tuberculosis financial allotments and subsidies to institutions and of state tuberculosis program. California license required. Special training and experience in tuberculosis and public health desirable. Monthly salary, $460 to $540 plus $20 emergency adjustment. Apply California State Personnel Board, 1015 L St., Sacramento, for copy of bulletin and application.

Wanted: Chief, Bureau of Records and Statistics, California State Dept. of Public Health. Duties consist of administration and supervision of statistical program of the department including registration of births, deaths, and marriages, morbidity statistics, service records, vital statistics and central tabulating unit. Certain administrative public health experience required. Monthly salary, $360 to $440 plus $35 emergency adjustment. Apply to California State Personnel Board, 1015 L St., Sacramento, for copy of bulletin and application.

POSITIONS WANTED

Physician, experienced in infectious diseases and communicable disease control, wishes position preferably as teacher. Will consider epidemiology or communicable disease control in health department. **A-515**

Industrial Hygienist, age 33, B.S. in Ch.E. Graduate training Harvard School of Public Health. Two years insurance engineering, 9½ years full charge industrial hygiene, heavy industry, patents, publications; now directing industrial research; desires responsible position in private industry. **IH-460**

Health educator, Ph.D. Michigan, experienced in health, physical education, and teaching. Excellent references. **H-516**

Health educator, Ph.D., Harvard, with training in medical science, public health and education, experienced as teacher, seeks position in Northeastern United States. **H-512**

Health educator, Master of Science in Public Health Education, with experience in visual aids, would like position with private agency in Southwest or Central West. **H-514**

[END OF A.P.H.A. LISTING]

REGULAR CORPS APPOINTMENTS FOR MEDICAL OFFICERS IN THE U. S. PUBLIC HEALTH SERVICE

A competitive examination for appointment in the Regular Corps in grades of Assistant Surgeon (1st Lieutenant) and Senior Assistant Surgeon (Captain) will be held on the dates listed below.

Regular Corps appointments are permanent in nature and provide unique opportunities to qualified doctors for a life career in one or more of a large number of fields including research, general hospitals, special hospitals, foreign duty, and federal, state, and local public health programs. Assignments are made with all possible consideration of the officer's demonstrated abilities and experiences There is ample opportunity for professional growth and development.

Examinations will be oral and written. The oral examination will be held at 9:00 A.M. at the several places listed below on the dates shown. The written examination will be held on October 8, 9, and 10 at places convenient to the candidate and the Service.

Applicants for the grade of Assistant Surgeon must be citizens of the United States, must present diploma of graduation from recognized medical school, must have had or be in process of completing an internship or its equivalent, and must have a physical examination at place of oral examination by medical officers of the Service.

Applicants for the grade of Senior Assistant Surgeon must meet the above requirements and must have had an addi-

tional four years of training or experience.

Application forms may be obtained by writing to the Surgeon General, U. S. Public Health Service, Bethesda Station, Washington 14, D. C.

Entrance pay for Assistant Surgeon with dependents is $3,411 a year and for Senior Assistant Surgeon with dependents is $3,991 a year. Promotions are at regular intervals up to and including the grade of Medical Director which corresponds to full Colonel at $7,951 a year. Retirement pay at 64 is $4,500 a year. Full medical care including disability retirement at three-fourth's pay is provided. All expenses of official travel are paid by the Government. Thirty days' annual leave with pay is provided. All commissioned officers have full military status for the duration of the present war.

Places and dates of oral examinations:

Atlanta, Georgia—Malaria Control in War Areas, 605 Volunteer Building .....Sept. 13
Baltimore, Maryland — Marine Hospital, Wyman Park Drive & 31st Street.....Oct. 1
Boston, Massachusetts — Marine Hospital, 77 Warren Street (Brighton) .....Sept. 10
Chicago, Illinois—Marine Hospital, 4141 Clarendon Avenue..Sept. 25
Cleveland, Ohio — Marine Hospital, Fairhill Road & E. 124th Street .....Sept. 27
Detroit, Michigan—Marine Hospital, Vindmill Pointe.....Sept. 26
Fort Worth, Texas—U. S. Public Health Service Hospital.....Sept. 15
Kansas City, Missouri—USPHS District No. 7, 603 B.N.A. Building .....Sept 22
Kirkwood, Missouri — near St. Louis—Marine Hospital, 525 Couch Avenue .....Sept. 24
Los Angeles, California—USPHS Relief Station, 406 Federal Building .....Sept. 17
New Orleans, Louisiana—Marine Hospital, 210 State Street...Sept. 14
New York, New York—Stapleton, Staten Island — Marine Hospital .....Sept. 11
Norfolk, Virginia—Marine Hospital, Hampton Boulevard-Larchmont .....Sept. 12
San Francisco, California—Marine Hospital, 14th Avenue & Park Boulevard .....Sept. 18
Seattle, Washington — Marine Hospital, Judkins Street & 14th Avenue, South .....Sept. 20
Washington, D. C.—USPHS Dispensary, Fourth and D Streets, S.W. .....Oct. 2

Opportunities Available

Advertisement

WANTED—(a) Clinic physician: duties consist of attendance at maternity center, well baby clinics, skin clinics, physical examinations of school children, and epidemiological investigations; college town of 100,000 not far from Chicago. (b) Pediatrician to serve as assistant director of health department, school system of fashionable winter resort town; part- or full-time; California. (c) Director of student health department, co-educational college having progressive program; enrollment of 4,000 students; 15 bed infirmary, staff of eight nurses; town of 16,000; Southwest. (d) Director, county health unit now being opened; county population, 80,000; headquarters in county seat (30,000); Midwest; $6,500. (e) Young woman physician; young women's college having enrollment of 300; duties relatively light, including teaching of Hygiene; South. (f) Director of tuberculosis control, division of county health department; should be trained in public health with experience in tuberculosis control or experienced in tuberculosis work with interest in public health medicine; new and rapidly expanding tuberculosis program; South. (g) Assistant university physician; duties consist of caring for ill students and attendance at the daily sick call; approximately 1,200 students; appointments will prove particularly interesting to partially disabled veteran seeking mild climate; $450, complete maintenance; Gulf Coast. **PH9-1**, The Medical Bureau, Burneice Larson, Director, Palmolive Building, Chicago 11.

WANTED—(a) Public health nursing consultants for following divisions: generalized, orthopedic, maternal and child health, tuberculosis and rheumatic fever; $2,400–$3,000 plus travel expenses; Rocky Mountain area. (b) Public health or visiting nurse to direct out-patient department, large hospital located in vicinity of New York City; $2,400. (c) Public health nurse qualified in orthopedic nursing to give consultant and advisory service in orthopedic nursing to general public health personnel, duties include planning service in specific area; crippled children's commission; Middle West. (d) Director of public health program; must be qualified to supervise generalized public health nursing program; new division of public health education now being established; city-county health department; Southwest. (e) Two public health nursing directors several public health supervisors, two field representatives, and five staff nurses to become associated with California unit of national organization; permanent; salaries, ranks, dependent upon qualifications. (f) Several public health nurses, preferably with knowledge of Spanish or Portuguese; South and Central America; must be young enough to withstand rigors of living and working in Latin America. **PH9-2**, The Medical Bureau, Burneice Larson, Director, Palmolive Building, Chicago 11.

WANTED—Community health educator and, also health educator in industry; both positions require

men who are adaptable, friendly, and qualified in public relations and public speaking; must be able to stimulate interest in health among various groups; varied program; eastern university medical center; salaries start at $3,600. (b) Senior statistician; duties consist of supervising, inaugurating and directing statistical research; public health program; Master's degree in statistics desirable; Middle West. (c) Health educator for important position with tuberculosis organization; Pacific Coast. (d) Several sanitary engineers; new project; Middle West. (e) Health educator; municipal tuberculosis association; New England. **PH8-3**, The Medical Bureau, Burneice Larson, Director, Palmolive Building, Chicago 11.

WANTED—(a) Bacteriologist well qualified in medical parasitology; municipal laboratories established to utilize recently developed laboratory diagnostic procedures in connection with virus diseases; Middle West. (b) Bacteriologist-immunologist for important position in development laboratories of pharmaceutical company; experience in preparation of antigens and animal immunization required; East. (c) Bacteriologist; county public health laboratories; resort town, New York; $200. (d) Chemist to direct laboratories of maternity health department; duties include working with departments of obstetrics and pediatrics, university medical school; Middle West. **PH8-4** The Medical Bureau, Burneice Larson, Director, Palmolive Building, Chicago 11.

Situations Wanted

Advertisement

Young physician well qualified as health educator; B.S., M.D., and master of health degrees; several years, director of university health service where he has carried a rather heavy teaching load; recommended as an exceptionally fine teacher, clear thinker about problems of education and student welfare, able to stimulate students to high degree of activity; for further information, please write Burneice Larson, Director, Medical Bureau, Palmolive Building, Chicago 11.

Young dentist, graduate of Western Reserve University School of Dentistry; several years' successful private practice; interested in teaching and public health dentistry; for further information, please write Burneice Larson, Director, Medical Bureau Palmolive Building, Chicago 11.

Health educator; A.B. degree eastern school; graduate training in public health; in charge department of public health education in municipal health department, eight years; for further information, please write Burneice Larson, Director, Medical Bureau Palmolive Building, Chicago 11.

Bacteriologist; A.B., M.A., Ph.D. degrees; several years' successful teaching and research experience in general, dairy and food bacteriology; past several years, director, bacteriological department, metropolitan department of public health; for further information, please write Burneice Larson, Director Medical Bureau, Palmolive Building, Chicago 11.

NEWS FROM THE FIELD

NEW YORK CITY PLANS LARGE POST-WAR EXPANSION IN HEALTH FACILITIES

Mayor LaGuardia recently announced that on behalf of the City of New York he had signed a contract with Columbia University and the Presbyterian Hospital for the construction of a tropical disease hospital, a health research institute, and a hospital research institute to be operated by the City on land ceded by the Columbia Presbyterian Medical Center. Subsequently it was announced that preliminary funds had been made available by the Bureau of Community Facilities, Federal Works Administration, for the preparation of plans for a $2,200,000 hospital for tropical and communicable diseases. The need for the hospital was said to arise from the increase in international airplane travel and from the impact of returning service men and women, especially those from the tropics. The hospital will have a capacity of 300 patients and it is to be built on a tract facing the Hudson River between 165th and 168th Streets. On the same tract, a short distance north of the hospital it was announced that the City proposed to build a public health laboratory for research and training purposes that would cost $2,690,000. The announcement states that because New York is an important world port and because medical science has a great deal to learn about tropical diseases and related problems, the city had decided to embark on this twofold project of erecting the hospital, adjacent laboratory and research and teaching center.

BRITISH SOCIETY OF MEDICAL OFFICERS OF HEALTH HOLDS ANNUAL MEETING

The County Borough Group of the Society of Medical Officers of Health held their annual meeting July 13–15 at Wadham College, Oxford, under the presidency of Dr. Arthur Massey. Among the members present were Sir Wilson Jameson and Dr. J. A. Charles of the Ministry of Health. The guests at the inaugural dinner held in Hall at Wadham were the Mayor of Oxford, Sir E. Farquhar Buzzard Bt., Professor John A. Ryle and Dr. Robert Sutherland. On July 14, the Mayor gave an official reception for members at the Town Hall. The papers read at the meeting included: The Institute of Social Medicine—Problems and Prospects, by Prof. J. A. Ryle, Health Education, by Dr. R. Sutherland, Post-war Housing, by Dr. J. Greenwood Wilson, and School Medical Services and the New Education Act, by Dr. G. C. Williams. There was a special demonstration by Mr. H. Cotton of the statistical methods and machines in use at the Institute of Social Medicine. The Group elected Dr. R. H. H. Jolly as next year's President. The honorary secretary of the Group is Dr. J. Greenwood Wilson.

DR. PERKINS TO STUDY HEALTH CONDITIONS IN ITALY

Dr. James E. Perkins, director of the Division of Communicable Diseases, New York State Department of Health, began a leave of absence on June 15 during which he will go to Italy to serve on the Italian Medical Nutrition Mission. The Mission is studying health problems which have developed in that country following the war and is aiding in the establishment of a program for their control.

Dr. Perkins was commissioned as a reserve officer for the purpose by the

U. S. Public Health Service and assigned to the United Nations Relief and Rehabilitation Administration under which the Mission is operating. He will assist the Mission in all aspects of its work within the scope of epidemiology.

One of the major objectives in this field is to learn the extent of malnutrition among the population and to assist UNRRA in raising nutrition levels as quickly as possible. The prevalence of malnutrition will be estimated by means of a series of surveys of representative samples of the population, throughout Italy, the nutritional status to be determined by clinical manifestations and x-rays of long bones. Tied in with these surveys will be an attempt to ascertain the prevalence of active tuberculosis which is known to have increased tremendously. Its presence will be detected through chest photofluorographs.

Another aspect of the study, which comes within the field of nutrition research, will consist of intensive investigation over a considerable period of time of approximately 1,000 persons in one locality. The reciprocal relationship between malnutrition and the development of clinical cases of various communicable diseases will be studied also.

In addition to assisting in these inquiries, Dr. Perkins will aid in the suppression of diphtheria, typhoid fever, and other communicable diseases which have become widespread since the war.

Teams of Italian physicians, nurses and other specialized personnel have been organized to assist in the studies. These local groups will carry on the work after the American members leave.

Dr. Perkins plans to be in Italy for three months as co-epidemiologist of the Mission to continue activities which have been conducted over a similar period by Dr. Ernest L. Stebbins, New York City Health Commissioner, who accompanied the first contingent which left in April and who has returned to this country.

MENTAL CLINICS FOR VETERANS

Five clinics for veterans have been established by the Michigan Society of Neurology and Psychiatry at Ann Arbor, Detroit, Flint, Kalamazoo, and Saginaw in coöperation with the Michigan State Hospital Commission and the State Office of Veterans' Affairs. The Detroit clinic began accepting patients for treatment February 6. This clinic, which is financed principally by the war chest of metropolitan Detroit, occupies quarters provided by Harper Hospital and is in operation three evenings each week; eighteen psychiatrists are contributing their services without compensation. Five additional clinics in upper Michigan are being planned by the Michigan Society of Neurology and Psychiatry sometime within the near future.

SCHOOL HEALTH SERVICE IN LOCAL COMMUNITIES

"Local Health Units for the Nation," a report of an Association Subcommittee published in August, suggests a minimum program of local health service for approximately one dollar per capita through 1,200 health units that would cover the 3,070 counties of the country and their contained cities.

The basic, perhaps revolutionary, idea of the committee is that present-day conditions demand present-day methods. Whereas there are about 155,000 units of local government, it would consolidate these for local health purposes into 1,197 units with an average population of 110,000 and only 14 per cent with less than 45,000.

Since school districts are 70 per cent of the 155,000 local governmental units and since it is not an unusual practice for school boards to organize school health service apart from the local health department, school districts are the chief source of multiplicity of local health jurisdiction. In New Jersey,

which has 567 municipalities, each with responsibility for local health service, state law requires that school health service be administered by local school boards. In Massachusetts a law in existence since 1906 prohibits any city health department from carrying on the health work of public schools unless it had already done so when the law was passed, but it serves parochial schools. In Pennsylvania school health service is the responsibility of school districts with populations of 5,000 or more; in others it rests with the state health department's local health service program. There are, of course, numerous examples of school health service administered by health departments as in Buffalo, New York City, Rochester, Detroit, Milwaukee, San Francisco, and Worcester, and in the counties of Alabama, Florida, Georgia, and Kentucky.

The committee recommends that, where a well organized local health department exists, it should carry on school health service with close coöperation of both groups, including active teacher participation in the program, particularly in child health, in public health nursing, in health education, and in a public health dental program now very largely lacking. It believes much overlapping of effort can be avoided by a single responsible authority. It believes also that the educational program itself is so important that it should not be burdened with a program for the administration of which another community service has the requisite organization and professional personnel.

MEXICO NUTRITION PROJECT RENEWED

According to a recent issue of *Science*, for the third successive year the W. K. Kellogg Foundation has made a grant to the Pan American Sanitary Bureau in support of a nutrition project in Mexico conducted by the Nutritional Biochemistry Laboratories of the Massachusetts Institute of Technology in collaboration with the Mexican Institute of Nutrition. In previous years, three physicians and two chemists from Mexico were trained in this country; a large number of Mexican foods were analyzed; a federal school lunch program was initiated; the nutritional status of a thousand school children in Mexico City was determined, and the equipment for a modern food analysis laboratory was provided. A part of the present grant of $10,300 will be used to encourage the further analysis of Mexican foods. Dr. Francisco de P. Miranda is Chief of the Mexican Institute of Nutrition, and Professor Robert S. Harris, of the Massachusetts Institute of Technology, is in charge of the project.

TRUDEAU MEDAL AWARDED DR. FLORENCE R. SABIN

The National Tuberculosis Association has announced the award to Dr. Florence R. Sabin of Denver of the Trudeau Medal for meritorious contributions to the cause, treatment, or prevention of tuberculosis. Dr. Sabin is known for her work on the pathology of tuberculosis and on the origin, nature, and activities of the white blood cells. The Medal was established in 1926 in memory of Dr. Edward L. Trudeau, the association's first president.

Dr. Sabin, who is a member of the N.T.A.'s committee on medical research, has long been engaged in studies of the physiologic activities of the chemical fractions of the tubercle bacillus.

TRAINING FOR THE SCIENTIFIC PROFESSIONS

"For science in this country—no matter what it has achieved—has been doomed to a season of sterility. And one of the most urgent questions before Congress and the people today is how to shorten that season of sterility. We

haven't come to the season yet. We are headed for it. It will go down in the books for all time and all posterity that in this war the American democracy shoveled its potential scientists into the armed forces, and thus killed off large numbers of them and, what is to the point today, it failed almost altogether to educate a six year supply of scientists. The result is that we shall be short about 150,000 scientific and technical students with bachelors' degrees, and ten years from now we shall be short 17,000 men capable of doing original scientific work in chemistry, engineering, geology, mathematics, physics, and the biological sciences."

Thus—Raymond Ewing in a broadcast of July 19 in support of the plea of Dr. Vannevar Bush, Director of the Office of Scientific Research and Development, to President Truman to establish a government agency which will provide 24,000 undergraduate scholarships and 900 graduate fellowships in science.

Dr. Bush's report and Mr. Swing's broadcast were made coincidentally with an action of the Executive Board which declared the American Public Health Association's support of a joint report of the National Research Council and the American Council on Education dealing with the need for the immediate resumption of training for the scientific professions. Copies of the document may be obtained from Dr. M. H. Trytten, 2101 Constitution Avenue, Washington 25, D. C.

AMERICAN ASSOCIATION OF UNIVERSITY WOMEN FELLOWSHIPS

National, international, and undesignated Fellowships, the majority of $1,500 each, and a special achievement award of $2,500 are offered by the American Association of University Women for graduate study and research for 1946–1947.

These Fellowships are awarded in general to candidates who have completed two years of residence work for the doctor's degree, or who have already received the degree. The greatest importance is attached to the project on which the candidate wishes to work, its significance, and the evidence of the candidate's ability to pursue it. Applications and supporting materials must reach the office in Washington by December 15, 1945. For detailed information concerning these Fellowships, instructions for applying, and the conditions of acceptance, address the Secretary, Committee on Fellowship Awards, American Association of University Women, 1634 I Street, N.W., Washington 6, D. C.

AMERICAN MEDICAL OFFICERS AID IN FIGHT AGAINST CHOLERA

It has been announced by the United Nations Relief and Rehabilitation Administration in Washington that a group of physicians is now enroute to China to assist in fighting a cholera epidemic in Chungking. Among the members of the group are James Watt, M.D., Dr.P.H., of the U. S. Public Health Service staff, E. K. Musson, M.D., M.P.H., USPHS (R) assigned to UNRRA, H. A. Reimann, M.D., Jefferson Medical College, Philadelphia, and W. W. Frye, M.D., Vanderbilt University, Nashville, Tenn.

RELEASE OF SANITARY ENGINEERS FROM ARMED SERVICES IS EXPEDITED

The attention of the *Journal* has been called to War Department *Circular 485*, "Relief of Officers . . . from Active Duty," under which the *Journal* is informed by the Public Health Service some work has been done recently to expedite the release of sanitary engineers. It is desired that health officers should be aware of these provisions.

Paragraphs 7 to 9, inclusive, cover those circumstances when it can be

definitely determined that an officer can render more valuable service to the nation in a civilian capacity. It is provided that the officer himself must initiate the request, which should be forwarded through channels of the respective service.

Persons in the armed services and executives of health departments interested in the return of essential staff members will benefit from a perusal of the *Circular No. 485*.

NEW BRITISH MINISTER OF HEALTH

The press has announced the appointment under the new Labor Cabinet of Great Britain, of Aneurin Bevan, 47, as Minister of Health. Mr. Bevan is a former miner who has been an active member of the Labor Party.

FULL-TIME VITAL STATISTICS REGISTRARS RECOMMENDED

At a meeting of the State Registration Executives of Region III of the Council on Vital Records and Vital Statistics held on May 9, 1945, in Gatlinburg, Tenn., the following resolution was passed:

WHEREAS, statistics compiled from recorded births and deaths are the basis of all public health programs, and

WHEREAS, the value of such statistics depends upon the completeness and accuracy of such birth and death registration, and

WHEREAS, the completeness and accuracy of birth and death registration are contingent upon the time and effort given the work by the local registrar, and

WHEREAS, this work is of such importance as to require the entire time of a local registrar in a health unit,

THEREFORE, every health unit should have a registrar of vital statistics on a full-time basis, with travel allowance, and to this end we recommend that the Council on Vital Records contact the U. S. Public Health Service, the American Public Health Association, and the State and Territorial Health Officers Association in an effort to develop and to further a plan to incorporate the position of registrar into every full-time health unit.

NATIONAL ADVISORY HEALTH COUNCIL OF THE U. S. PUBLIC HEALTH SERVICE

The National Advisory Health Council met at Public Health Service headquarters in Bethesda, Md., on June 19 and 20, 1945.

The two day session was devoted to discussion of the current and future activities of the several Bureaus of the Public Health Service.

Surgeon General Thomas Parran, in opening the meeting, called attention to the legal functions now vested in the National Advisory Health Council under the provisions of the Public Health Service Act of 1944 (P.L. 410). Before the passage of this law, the Council served solely in an advisory capacity. Now the Council has the legal responsibility to:

1. ". . . advise, consult with, and make recommendations to the Surgeon General on matters relating to health activities and functions of the Service"; and to serve in other capacities as requested;

2. Recommend research projects for grants-in-aid in scientific fields other than cancer research, and recommend other procedures for the advancement of scientific research;

3. Recommend the adoption of regulations by the Service with respect to interstate quarantine for the prevention of communicable diseases, including regulations for the apprehension, examination, and detention of persons who are spreading disease.

The programs of the Sanitary Engineering Division, the Bureau of Medical Services, and the Bureau of State Services were discussed on the first day. On the second day, a proposed plan for training of Public Health Service personnel was presented by the Division of Public Health Methods; the Nurse Education Division presented proposals for the post-war nursing program; and the work of the National Institute of Health was discussed.

The Council recommended the approval of a grant-in-aid of $92,000 to the University of Utah for research on muscular dystrophy. This is the first

grant-in-aid for general research projects to be made under the provisions of P.L. 410.

Among other important decisions of the Council were recommendations that:

1. A committee of the Council be appointed to act with designated officers of the Service in the development of a program of clinical research in the Public Health Service;

2. The Public Health Service strengthen its control of the interstate spread of disease through consultant services to public health laboratories and through maintenance of a $1,000,000 emergency fund to be used in epidemics and disasters;

3. The Public Health Service undertake demonstrations in selected communities of generalized public health nursing programs, including bedside care;

4. The Public Health Service establish a training program for their own personnel, which would include orientation, work experience, observations, in-service training, and opportunities for State and local personnel to participate;

5. The program of grants-in-aid and technical services to the States in the field of industrial hygiene be expanded;

6. The Public Health Service seek appropriations for grants-in-aid for general research to be allotted to qualified institutions and individuals;

7. When the federal government undertakes grant-in-aid programs related to public health and sanitation, the Public Health Service be empowered to conduct investigations for determination of the nature and extent of the problems involved and to approve the allocation of funds, functional effectiveness, and placement of plants, installations, and constructions required of such programs.

In addition, the Council approved the policy of the Public Health Service on national programs for the control of water pollution.

Regular meetings of the Council will be held twice a year; special meetings will be called as needed. Council members are to serve as chairmen of special committees dealing with specific subjects.

The members of the National Advisory Health Council are Alphonse R. Dochez, M.D., Clarence C. Selby, M.D., Kenneth F. Maxy, M.D., Alfred C. Reed, M.D., John H. Musser, M.D., Henry F. Vaughan, Dr.P.H., Harry S. Mustard, M.D., Gordon M. Fair, Carl S. Marvel, and William C. Rose.

Ex Officio members are Captain T. J. Carter, MC, USN, Asst. Surgeon General R. E. Dyer, Harry W. Schoening, and Brigadier General James S. Simmons, USA.

COLUMBIA UNIVERSITY OFFERS COURSE IN HOSPITAL ADMINISTRATION

Columbia University announces that, aided by a grant from the W. K. Kellogg Foundation, it will offer a course in Hospital Administration beginning September 27, 1945. The course will be of approximately 21 months' duration: an academic year in residence, and a calendar year of supervised assistantship in an affiliated hospital. A baccalaureate degree will be a minimum requirement. Women will be admitted on the same terms as men. The course will be offered through the School of Public Health of the Faculty of Medicine of the University.

X-RAY SURVEY CENTER PLANNED IN CALIFORNIA

A mass x-ray survey plan, calling for the establishment of a permanent x-ray survey center open to the public five days a week, has been unanimously approved by the Board of Directors of the Sacramento County Tuberculosis and Health Association. The plan will make it possible to offer free x-rays to every family in the city and county in the next two years. An estimated 500 families daily will be sent direct invitations by mail giving them specific appointments for x-ray examination, these to be sent after the mailing of literature explaining the purpose of the county-wide program and a summary of the tuberculosis problem in the area. It is hoped to have the plan in full operation by fall, according to the *Bulletin* of the N.T.A.

NATIONAL INSTITUTE OF HEALTH RESEARCH FELLOWSHIPS

The U. S. Public Health Service announces the creation of National Institute of Health research fellowships, after July 1, 1945.

The junior research fellowships will be available to those holding master's degrees in the sciences (such as physics, chemistry, entomology, etc.) allied to public health, from an institution of recognized standing. The stipend will be $2,400 per annum.

The senior research fellowships will be available to those holding a doctor's degree in one of the sciences allied to public health. The stipend will be $3,000 per annum.

These fellowships will offer an opportunity for study and research at the Institute or some other institution of higher learning, in association with highly trained specialists in the candidate's chosen field.

Letters of inquiry should be addressed to The Director, National Institute of Health, Bethesda 14, Md.

NEW OFFICERS OF AFFILIATED SOCIETIES

Three affiliated societies of the A.P.H.A. elected the following new officers at recent meetings:

Colorado Public Health Association

President—Millard F. Schafer, M.D., Colorado Springs
Vice-President—Mary H. Emberton, R.N., Denver
Treasurer—Frances Hedges, Pueblo
Secretary—Eleanor Lee Hearon, Denver

Idaho Public Health Association

President—E. L. Berry, M.D., Orofino
1st Vice-President — Stuart Robinson, D.D.S., Gooding
2nd Vice-President—Mrs. H. J. Maughn, Preston
3rd Vice-President — George C. Halley, M.D., Twin Falls
4th Vice-President—H. L. Newcomb, M.D., Emmett
5th Vice-President—Mrs. Grant Hess, Boise
Secretary—John W. Wright, Boise
Treasurer—Lucy Higgins, Boise

Utah Public Health Association

President—Thomas L. Martin, Ph.D., Provo
President-elect—Elmer B. Quist, Salt Lake City
Vice-President—William V. Hickey, Salt Lake City
Treasurer—Helen E. Vance, Salt Lake City
Secretary—E. H. Bramhall, Salt Lake City

CHICAGO INDUSTRIAL HEALTH COMMITTEE

The Chicago Industrial Health Committee is the name tentatively selected for an organization now being developed for Chicago and Cook County. The project is being formed to provide industrial workers in participating industries with continuous and authentic health information on vital health problems and to promote the utilization of procedures, such as Kahn tests, chest x-rays, and vision testing, to be made available through coöperating health agencies as requested and available. The entire project will be set up as a health education program.

PERSONALS

Central States

RICHARD A. BOLT, M.D., DR.P.H.,* has resigned as Director of the Cleveland Child Health Association, Cleveland, Ohio, to join the staff of the University of California School of Public Health, Berkeley.

EDWARD W. CLINE, M.D.,† of Platte City, Mo., Health Officer of Platte County, has been appointed to a similar position in charge of the newly merged City-County Health Department of Jasper County with offices in Joplin.

MAX L. DURFEE, M.D.,† Health Director at Iowa State Teachers College, Cedar Falls, Ia., since 1939, has resigned to accept a position as

* Fellow A.P.H.A.
† Member A.P.H.A.

Director of Health Service at the University of Oklahoma, effective July 1.

FRANK L. GUNDERSON, PH.D.,† who has served as Executive Secretary of the Food and Nutrition Board of the National Research Council, Washington, has announced that as of October 1 he will become associated with Pillsbury Mills, Inc., in Minneapolis, Minn., and will be concerned with product research and development. He will continue as a consultant to the Food and Nutrition Board.

ROLV S. HEGGE, M.D., of Austin, Minn., has been named Health Officer of Mower County to succeed DR. JAMES J. MORROW.

CLARA R. JOHNS, M.D.,† of Topeka, Kan., was recently appointed Health Officer of Johnson County.

ROLAND F. MUELLER, M.D., of Two Harbors, Minn., has been appointed Health Officer of Lake County.

IRA F. THOMPSON, M.D.,* has announced his resignation as Commissioner of Health fo Racine Wis., effective sometime in October. Dr. Thompson has been serving in the position since 1932, when he succeeded DR. WILLIAM W. BAUER.*

CHANGES IN HEALTH OFFICERS IN MICHIGAN

VERNE L. VAN DUZEN, M.D., of Belding, Mich., has been appointed Director of Health for the Mecosta-Osceola Health Department, effective June 1.

JAMES J. CROLEY, M.D., of Houghton, has been appointed Director of Health of Kalamazoo County.

Eastern States

GEORGE BAEHR, M.D.,* has been reappointed by Governor Dewey as a member of the New York State Public Health Council to serve a 6 year term dating from January 1, 1945.

FRANCIS G. BLAKE, M.D., Sterling Professor of Medicine and Dean of Yale University School of Medicine, New Haven, received the Charles V. Chapin Memorial Award for 1945 from the City of Providence, R. I. during the 134th annual meeting of the Rhode Island Medical Society. The subject which Dr. Blake chose for his Chapin oration was "Some Recent Advances in the Control of Infectious Diseases."

HAROLD W. BROWN, M.D.,* Columbia University, College of Physicians and Surgeons, New York City, received the honorary degree of Doctor of Science at the recent commencement of Kalamazoo College, Kalamazoo, Mich.

MAJOR FRANKLIN M. FOOTE, MC AUS,* has been made Acting Director of the Department of Military Sanitation, Medical Field Service School, Carlisle Barracks, Pa. He is responsible for teaching military preventive medicine and field sanitation to physicians, dentists, veterinarians, and other officers.

BASIL C. MACLEAN, M.D., M.P.H.,* Director of the Strong Memorial Hospital, Rochester, N. Y., has been appointed professor of hospital administration in the University of Rochester School of Medicine and Dentistry. Dr. MacLean has been director of the Strong Memorial Hospital since 1935 and recently served with the Medical Corps of the Army as consultant in the Surgeon General's office. Dr. MacLean is also in charge of a ten-member commission appointed by Governor Dewey to draft a program providing medical care for the state's needy and to make recommendations for action by the state legislature.

MARY POWER,† who has served as a staff member of the Onondaga Health Association in Syracuse, N. Y., in community health organization has

resigned to become Executive Secretary of the Fort Greene District Health Committee, Brooklyn, N. Y.

Southern States

GLENN H. BAIRD, M.D.,† has resigned as Health Officer of the Smyth-Washington-Bristol Health District in Virginia, to accept a commission with the U. S. Naval Reserve.

THOMAS K. CHANDLER, JR., M.D.,† of Tunica, Miss., Director of the Tunica County Health Department, has been appointed to a similar position in Coahoma County, succeeding DR. GUY R. POST,† who has become Medical Director of the Crippled Children's Service and Medical Consultant of Vocational Rehabilitation for the State.

HENRY HOLLE, M.D.,† of Austin, Tex., has been assigned as Medical Officer to the temporary delegation being sent by UNRRA to Warsaw, Poland. Dr. Holle has been associated with the Health Division of UNRRA since 1944. Prior to that time he was Chief Quarantine Officer of the Panama Canal, Balboa Heights.

JOHN McIVER JACKSON, M.D.,† has been appointed Health Officer of the Norfolk-Princess Anne Health District in Virginia, succeeding WILLIAM B. BAILY, M.D.†

RAYMOND D. KIMBROUGH, M.D., of Norfolk, Va., has been appointed Associate Professor of Preventive Medicine and Public Health and Associate Professor of Dermatology and Syphilology at the Medical College of Virginia, Richmond, effective May 1. He will continue his private practice.

COL. MARY G. PHILLIPS, ANC, former Deputy Director of the Nursing Division and Chief of the Nursing Policies Branch, Office of The Surgeon General, will depart for the Pacific Ocean Area on her new assignment as Director of Nursing Service. Her Army assignments include service in the Philippines as well as service in this country at various Army hospitals. She was assigned to the Nursing Division in The Surgeon General's Office as Assistant to the Superintendent of the Army Nurse Corps in May, 1943.

LUTHER A. RISER, M.D.,† has resigned as Director of the Department of Vital Statistics of the State Board of Health, Columbia, South Carolina.

THOMAS T. ROSS, M.D.,† of Little Rock, Ark., State Health Officer, was reappointed for a four year term when the State Board of Health met in quarterly session April 19. His new term began July 1, it is reported.

MARTIN H. SKAGGS, M.D., has resigned as Health Officer of Shelby County, Ky., effective June 1, to enter private practice in Taylorsville.

EDWIN BRUCE UNDERWOOD, M.D.,† of Morganfield, Ky., has been appointed Director of the Henderson County Health Department, succeeding EDWIN W. SIGLER, M.D.†

JOHN H. WALKER, M.D., of Atlanta, has been appointed Pediatric Consultant to the Division of Maternal and Child Health of the Georgia Department of Public Health, succeeding DR. PAUL R. ENSIGN.*

Western States

THOMAS J. HOWELLS, M.D.,† on May 18 was named Director of the Salt Lake County Health Department in Utah. Dr. Howells has served as Superintendent of the Salt Lake County General Hospital and also as Health Commissioner of Salt Lake City.

DAVID A. YOUNG, M.D., Assistant Professor of Psychiatry and Neurology at the University of Utah School of Medicine, Salt Lake City, has been

* Fellow A.P.H.A.
† Member A.P.H.A.

appointed General Superintendent of Mental Health for the four state hospitals of North Carolina, a newly created position. The appointment will be effective September 1. He is to coördinate the work of the four state institutions in order that better medical and mental care may be available.

CHANGES IN HEALTH OFFICERS IN WASHINGTON STATE

EMIL E. PALMQUIST, M.D.,† on July 1 was named Commissioner of Health for the City of Seattle. Dr. Palmquist was formerly Health Officer for King County.

R. E. CUTTS, M.D., has been named Head of the Maternal and Child Hygiene and Crippled Children's Section of the State Department of Health.

CEDRIC NORTHROP, M.D.,† is the Head of the newly created Section of Tuberculosis Control.

HOWARD W. LUNDY, DR.P.H.,* has been appointed Head of the Section of Public Health Education.

All these changes were effective as of July 1.

Foreign

DR. C. H. BENNING,* Surgeon (R), U. S. Public Health Service, is at present Medical Liaison Officer from UNRRA to the High Commission for Italian Refugees. Up until 1941, Dr. Benning was Deputy Commissioner of Health of Oakland County, Mich. Since August, 1941, he has served in Puerto Rico, Texas, Charlottesville, Va., Walter Reed Hospital, Washington, D. C., and Egypt.

BRIG. GEN. HENRY C. DOOLING, M.C., who was on a 30 day mission in the battle areas of the Mediterranean theater, has returned to his activities as Chief Health Officer of the Panama Canal. While in Italy, General Dooling met MAJOR GEN. MORRISON C. STAYER, M.C.,† who preceded him as Chief Health Officer of the Panama Canal. COL. ALBERT R. DREISBACH, M.C., acted as Chief in General Dooling's absence.

FELIX HURTADO, M.D.,† Havana, Cuba, has been appointed Chairman of Region 5 of the American Academy of Pediatrics, including all Latin American countries. Associated with Dr. Hurtado in this responsibility are DRS. F. GOMEZ of Mexico City and V. ESCARDO of Montevideo.

LUIZ MENDONCA E SILVA, M.D., who was employed in the Office of Health Education in the State Health Department in Rio de Janeiro, is studying currently at the DeLamar Institute of Public Health, Columbia University, New York.

LE COLONEL BRIGADIER VOLLENWEIDER has recently been appointed director of the Office of Public Health in Berne, Switzerland, having retired as chief of the Swiss Army Medical Service.

Deaths

SIMON WILLIAM BROWNSTEIN, M.D., who was for eighteen years Chief of Clinics for the City Board of Health in Chicago, died May 7, aged 78.

WILLIAM LITTERER, M.D.,* of Miami, Fla., died May 1, aged 67. He was formerly Professor of Bacteriology and Assistant Professor of Preventive Medicine and Public Health at Vanderbilt University School of Medicine, Nashville, Tenn., and Director of Laboratories for the Tennessee Department of Public Health for many years.

CHARLES JOHNSON SMITH, M.D., of Portland, Ore., one of the organizers and Past President of the Oregon State Board of Health, died April 19, aged 80.

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† Member A.P.H.A.